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June 26, 2015

HAND DELIVERY

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Buffalo, New York 14203

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NYS Department of Environmental Conservation – Region 9
270 Michigan Avenue
Buffalo, New York 14203

Mr. Konsella and Ms. Skalski:

Re: Tonawanda Coke Corporation
3875 River Road, Tonawanda, New York
Order on Consent – File No. 14-59; R9-20141203-96

Our firm represents Tonawanda Coke Corporation (“TCC”) with regard to the above referenced Order on Consent.

I have enclosed a copy of the revised Best Practices Management Plan as required by paragraph 5 of Schedule A of the above referenced Order on Consent.

If you have any questions on this submission, please contact me directly.

Very truly yours,

A handwritten signature in black ink, appearing to be "Rick W. Kennedy".

Rick W. Kennedy

RK/mjh
Enclosures

cc: Terri J. Mucha, Esq. (w/out enclosures)

BEST MANAGEMENT PRACTICES PLAN

**TONAWANDA COKE CORPORATION
TONAWANDA, NEW YORK**

RECEIVED
JUN 26 2015
P. J. ...
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Revised: June 2015

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CI-01 Site Plan



Tonawanda Coke Corp.
PO Box 5007
Tonawanda, NY 14151-5007
(716) 876-6222

Signature Page

*"I hereby certify that I am familiar with the Facility,
and attest that the Best Management Plan
will be implemented at the Tonawanda Coke Corporation."*

<u>Name</u>	<u>Title</u>	<u>Home Phone</u>	<u>Cell Phone</u>	<u>Signature</u>
Ed Dinsmore	VP Environmental	(716) 886-2627	(716) 418-5612	_____
Bob Kolvek	VP Operations		(716) 512-0061	_____
Pat Cahill	Plant Manager		(716) 550-1534	_____
Dan Heukrath	Byproduct Supervisor		(716) 864-2937	_____

1.0 INTRODUCTION

This Best Management Practices Plan (BMP Plan or Plan) has been prepared for the Tonawanda Coke Corporation (TCC, Facility, or Site) located at 3875 River Road, in the Town of Tonawanda, New York. The Plan satisfies specific requirements of the Facility's New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Discharge Permit Number NY-000 2399, effective November 23, 2005 and expiring July 31, 2010. TCC submitted a timely renewal application, and the permit has been administratively extended.

As required under the Special Conditions section of the Facility's SPDES Permit, the permittee shall develop a BMP Plan to prevent or minimize the potential for release of significant amounts of toxic or hazardous pollutants to the waters of the State. This Plan addresses the Special Conditions requirements of the SPDES Permit.

Note that the Facility's October 2014 Spill Prevention, Control and Countermeasure (SPCC) Plan in October was combined with the then-existing Facility BMP Plan. This BMP Plan replaces the version included in the October 2014 SPCC Plan. Also note that portions of the Facility's SPCC Plan are incorporated into this BMP Plan by reference.

This BMP Plan has also been prepared to satisfy two other specific requirements:

- The requirements of TCC's Town of Tonawanda Industrial Sewer Connection Permit No. 331 (Industrial User (IU) Permit), effective September 1, 2012. As required under Part II – Special Conditions/Compliance Schedule of the IU Permit – the Facility “shall develop, within 6 months of the effective date of this permit, an accidental spill prevention plan to eliminate or minimize the accidental or slug discharge of pollutants into the sewer system, which could have an effect on the Town's treatment system, sludge, or cause the Town to violate its SPDES permit.”
- The prevention and minimization of future releases of petroleum and petroleum derivatives at the Facility.

2.0 FACILITY DESCRIPTION

The Facility is located at 3875 River Road in the Town of Tonawanda, New York. Figure 2.1 presents the Facility location map.

TCC is a merchant producer of metallurgical foundry coke. Foundry coke is the primary product of metallurgical foundry grade coals. The raw material (coal) is almost exclusively from Kentucky, West Virginia, or Pennsylvania.

Three types of coal are primarily used at TCC. These include:

- High Volatile (30 to 40 percent volatile matter)
- Medium Volatile (20 to 30 percent volatile matter)
- Low Volatile (15 to 20 percent volatile matter)

These three types of coals are proportionally mixed together, treated with recycled coke fines, pulverized, and conveyed to oven bunkers. From the bunkers, the coal mix (approximately 19 tons) is charged to each coke oven as the coke from the previous cycle is removed from that oven. Therefore the term "continuous-batch" process is applicable to this operation. For approximately 30 hours, the coal is subjected to heat approaching 2,000 degrees Fahrenheit. In the absence of oxygen, destructive distillation takes place.

At the termination of the coking cycle, the incandescent coke is pushed from the oven and collected in a rail-mounted "hot car." The hot car transports the coke to the quench station, where water is used to cool the coke. Next, the coke is delivered to the coke screening station for size segregation and loading in rail cars or trucks for transport to users.

Several byproducts are recoverable from the gases generated in the coke oven during destructive distillation. However, no refinement takes place at this Facility. Light oil (a mixture of benzene, xylene, and toluene) was previously recovered and sold in crude form. TCC abandoned this operation in 2008, and is in the process of permanently closing all of the vessels and other equipment that was used for this purpose. Coal tar is still recovered and sold in crude form. The third and final byproduct recovered is Coke Oven Gas (COG), which is totally consumed by TCC. The COG is primarily used to underfire the coke oven battery. It is also utilized as a fuel to meet the steam requirements of the Facility. Figure 2.2 presents a typical coke and byproducts process flow diagram.

TCC operates a single battery of 60 coke ovens to produce merchant foundry coke. In these operations, priority pollutant materials are generated and treated. The material of primary focus for the BMP program is termed weak ammonia liquor (WAL). The WAL contains aqueous ammonia, cyanide, and phenol in concentrations that constitute an environmental concern if an accidental spill or discharge should occur. The WAL pH is typically in the range of 8.8 – 9.2. The table below presents the typical concentrations of aqueous ammonia, cyanide, and phenol in WL. Additional information about WAL and its handling in the Facility is contained in Section 8.0.

<i>Typical Analysis of Weak Liquor (WL)</i>	
Constituent	Approximate Concentration (ppm)
Ammonia	3500
Phenol	500
Cyanide	10

3.0 FACILITY WATER MANAGEMENT

The Facility discharges wastewater to the Niagara River under its SPDES permit. Four outfalls are permitted for discharge:

- Outfall 001: Permitted to discharge non-contact cooling water, boiler blowdown and stormwater runoff after treatment in two concrete-lined settling/skimming ponds (also known as lagoons).
- Outfall 002: Permitted to discharge coal pile runoff.
- Outfall 003: Permitted to discharge non-contact cooling water (from cooling the steam on the discharge side of the cogen turbine to increase efficiency). The Cogen facility was idled in 2008 and there has been no flow from this Outfall since.
- Outfall 004: Permitted as the combined flow for Outfalls 001, 002, and 003. Outfall 004 discharges to a drainage ditch on the East side of River Road. The water from this Outfall commingles with the road runoff and goes through a tunnel under River Road and into a marshy area West of the road. The outfall from the marsh goes into another

drainage ditch, where it joins with surface water and flows into the Niagara River.

Figure 3.1 presents the Facility Water Flow Diagram. Figure 3.2 presents the Facility Layout with the approximate locations of the outfalls labeled.

The Facility is also permitted to discharge sanitary waste and treated industrial wastewater (process water) to the Town of Tonawanda POTW under IU No. 331, effective September 1, 2012 and expiring August 31, 2015.

The process wastewater system, shown on Figure 3.3, consists of two sources contributing flow through a 6-inch forcemain to three treatment processes (stripping, settling, and pH adjustment) before joining the sanitary wastewater system prior to the guard gate monitoring station. At the monitoring station, total flow is measured through a parshall flume before discharging to the Town of Tonawanda sanitary sewer system under the Town Permit.

Facility stormwater is directed to two areas on the TCC property. Stormwater in operational areas is collected in Facility catch basins and routed to the two concrete-lined settling/skimming ponds where it is ultimately discharged to the River through Outfall 001. Stormwater falling on the coal piles/coke storage area is routed to Outfall 002 for discharge under the SPDES Permit.

Figure 3.4 presents a Facility Drainage Map with arrows indicating the approximate direction of surface runoff. Figure 3.4 also contains information on outfall pipe sizes, lagoon capacities, and cooling water intake details.

4.0 BMP COMMITTEE

The Special Conditions - BMP section of the Facility's SPDES Permit requires that a BMP Committee be established. The BMP Committee consists of the persons responsible for developing and implementing the BMP Plan and assisting the Facility in the Plan's implementation, maintenance, and revision. For TCC, the following individuals comprise the BMP Committee:

- Environmental Manager
- Plant Manager
- VP of Operations

- Byproduct Foreman

The Environmental Manager oversees the BMP Committee and is responsible for implementation of the Plan. The Environmental Manager is also responsible for the annual review of the Plan and for ensuring that the Plan is modified if changes in Facility operations impact any of the BMPs or the potential for releases of pollutants to waters of the State. The VP of Operations is responsible for supporting the environmental staff and for providing Facility manpower and equipment as necessary to implement the BMP Plan.

See the BMP Signature Page at the beginning of the document for Committee contact information.

5.0 RELATED FACILITY PLANS AND PROCEDURES

The Facility has a Spill Prevention, Control, and Countermeasure (SPCC) Plan in place that addresses the requirements of 40 CFR Part 112, related to the prevention of oil discharges into the navigable waters of the United States. Portions of the SPCC Plan are incorporated into this BMP Plan by reference.

6.0 IDENTIFICATION OF HAZARDOUS/TOXIC POLLUTANTS

The BMP section of the Facility's SPDES Permit requires the identification of all substances present at the Facility that are listed as toxic pollutants under Section 307(a)(1) of the Clean Water Act (CWA) or as hazardous pollutants under CWA Section 311, or that are identified as Chemicals of Concern by the Industrial Chemical Survey.

The following materials from the CWA Section 307 list of toxic pollutants are produced in the coke ovens:

- *Crude Light Oil:* The Facility no longer recovers or stores crude light oil as a byproduct of the coking process. The components (benzene, toluene, xylene, and naphthalene) that make up light oil are also in COG, which is used as an energy source at TCC.

- **Coal Tar:** Coal tar is a byproduct of the coking process. It is sold in crude form.
- **Ammonia:** Aqueous ammonia is contained in the WAL and is removed in a still prior to being discharged under IU No. 331.
- **Cyanide:** Cyanide is contained in the WAL and is removed in a still prior to being discharged under IU No. 331.
- **Phenol:** Phenol is contained in the WAL and is removed in a still prior to being discharged under IU No. 331.

There are also several different types of oil present at the Facility. These include diesel, used, and various types of lubricating oils. A complete listing of these materials and their locations within the Facility is contained in the SPCC Plan.

7.0 TOXIC "HOT SPOT" IDENTIFICATION

Per SPDES Permit NY-000 2399, a "hot spot" is a segment of an industrial facility; including, but not limited to soil, equipment, material storage areas, sewer lines, etc.; which contributes elevated levels of problem pollutants to the wastewater and/or stormwater collection system of that facility. For the purposes of this definition, problem pollutants are substances for which end of pipe treatment to meet a water quality or technology requirement may, considering the results of wastestream segment sampling, be deemed unreasonable. For the purposes of this definition, an elevated level is a concentration or mass loading of the pollutant in question which is adequately higher than the end of pipe concentration of that same pollutant so as to allow for and economically justify removal and/or isolation of the segment and/or best available treatment of wastewaters emanating from the segment.

TCC actively treats all flows discharging to wastewater and/or stormwater collection systems to meet established permit requirements. Based upon properly functioning Facility wastewater and stormwater treatment processes and the above definition, there are typically no toxic "hot spots" identified at the TCC Facility. However, byproduct treatment issues associated with the Ammonia Still caused increased levels of cyanide in the process wastewater stream. TCC implemented a NYSDEC and USEPA-approved plan to address the issue.

Components of the process wastewater treatment system are inspected monthly and the results are recorded using the attached form in Appendix A.3 of this plan. During the monthly inspection, any indication of unconfined or spilled process sludge or leaking

and/or improperly routed process wastewater flows shall be immediately reported. Additional inspections that will be used to identify "hot spots" are described in Section 9.4. In addition, discussions related to a wastewater treatment system audit and subsequent recommendations are provided in Section 9.13

In the event that sampling is required as part of the "hot spot" identification, analyses will be in accordance with the test procedures found at 40 CFR 136. Sampling will be in accordance with the procedures described in the Facility's SPDES permit.

For each measurement or sample taken, the following information shall be recorded:

- a. The exact place, date and time of sampling
- b. The dates the analyses were performed
- c. The person(s) who performed the analyses
- d. The analytical techniques or methods used
- e. The results of all required analyses
- f. Where measurement is made by a mechanical or electronic device, accuracy of the device shall be certified correct every year by the manufacturer

In accordance with the terms of its SPDES permit, TCC performs the additional monitoring that is required whenever a SPDES Action Level is exceeded.

8.0 REVIEW OF FACILITY COMPONENTS AND SYSTEMS

As required by the BMP section of the SPDES Permit, the Facility performed a review of plant components and systems where the toxic/hazardous pollutants identified in Section 6.0 are used, stored, or handled. This section presents the findings of the review.

As first discussed in Section 2.0, WAL is stored in several locations during the wastewater treatment process before being discharged to the Town of Tonawanda sewer system. WAL is initially collected and stored in the BH and surge tanks located outside of the pumping building. There are also two 30,000 gallon WAL storage tanks located just South of the building that contains the Operations Manager office. The WAL is then sent to the Ammonia Still, where the hazardous constituents are removed, before going to the Equalization (EQ) Tanks located on the South side of the property. From the EQ tanks, the flow is by gravity to the Outfall by the Guardhouse, prior to effluent discharge under IU No. 331. Spill containment exists in each of these areas in the form of concrete or earthen diking. Figure 8.1 shows the location of all containment areas, including areas for transfer of materials by truck and rail car.

Within the spill containment diking, the potential to release material to the environment is extremely low. However, during WAL treatment it is necessary to constantly transfer WAL from the surge tank to the WAL storage tanks and ultimately to the EQ tanks. The transfer is accomplished by overhead pipelines that run between the protective dikes. Should failure of any type occur in the pipelines, the potential exists for WAL to flow to the stormwater sewer system directly or via rainfall run-off routes.

A "worst case" failure scenario was developed as part of the SPCC Plan and is repeated here for completeness.

The worst-case failure would be a pipeline rupture that could discharge at a rate of 70 gallons per minute (gpm). Since the basic parameters are known, an impact scenario can be calculated.

Maximum Spill Rate:	70 gpm
Average Clean Water Sewer Flow Rate:	1840 gpm
Niagara River (Receiving Water Flow Rate):	75,000 cu. ft/sec
Settling/Skimming Pond Capacity:	200,200 gals.

A total pipeline rupture would initially impact the plant sewer system at the aforementioned rate of 70 gpm. Approximate concentration levels in the sewer would then be:

Ammonia	126.3 ppm
Phenol	18.0 ppm
Cyanide	0.4 ppm

The sewer flow would then proceed to the concrete settling/skimming ponds (lagoons) where it would be retained approximately 2 hours before the pollutants would begin to enter the receiving water (assuming in the worst case scenario, that the source of the rupture had not yet been secured and stopped). The ponds have the capability to isolate their contents from further inflow.

Assuming impact on only 1/10 of the receiving water flow, the concentration level in the Niagara River would be detected at:

Ammonia	0.073 ppm
Phenol	0.010 ppm
Cyanide	0.0002 ppm

As discussed in Section 6.0, benzene, toluene, and xylene are components of light oil. Again, since TCC no longer recovers or stores light oil, the potential for release of these constituents is extremely low.

Management of coal tar produced in the process is discussed in Section 9.6.

8.1 FACILITY SPILL HISTORY

There have been five recorded spill incidents involving petroleum compounds since TCC purchased and began operating this facility. The first occurred on December 21, 1979 at the section of the plant known as the RFLO coils. These coils were being utilized for heat transfer at that time. Subsequent to this spill incident, alternative heat transfer means have been employed resulting in the decommissioning of the RFLO coils. This spill did not result in any material entering the Niagara River.

The second incident occurred on February 21, 1980. On this date, a thaw event apparently carried small quantities of petroleum through the containment lagoons to the Niagara River. TCC estimated that no more than 3 gallons of petroleum reached the River. An increased emphasis on housekeeping has prevented subsequent incidents of this nature.

The third incident is a result of legacy wastes. The NYSDEC performed a Facility inspection in November of 2012, and noticed several surface areas that were colored in a nature indicative of petroleum spills. NYSDEC then established Spill No. 1207205 to address this problem. TCC is in the process of complying with a stipulation agreement with NYSDEC.

The fourth incident occurred on March 18, 2014. A spill of approximately 1 gallon of hydraulic oil occurred. Spill No. 1311845 was assigned to the spill. It was agreed to by the company and NYSDEC that this spill would be addressed in conjunction with the stipulation agreement for Spill No. 1207205.

The fifth incident involved a spill during a tar loading event of a transfer vehicle on July 24, 2013. NYSDEC assigned Spill No. 1304471 to this event. TCC addressed the affected area and the Spill No. was closed. TCC has established safeguards, including a Tar Loading Report (see App A-2), to prevent a reoccurrence of this type of incident.

There have been two spills of chemical compounds reported. The first occurred on September 9, 2014, when a valve in the Byproducts area ruptured, resulting in a loss of

about 50 gallons (less than the Reportable Quantity) of WAL. This liquor was absorbed in the breeze (coke fines) that covers the ground in this area. Additional breeze was placed on top of the spill before all of the material (~10 cy) was scooped up by a front end loader and hauled to the mixing pad, where it was placed in a segregated area. The final disposition of this material is still a topic of discussion between TCC and NYSDEC. The incident was reported to NYSDEC in a timely fashion and there were no injuries and no impact on the environment.

The second occurred on or about September 24, 2014, when an open valve on the bottom of a sodium hydroxide tank that was in the process of being closed resulted in the release of approximately 5900 gallons of a 20% NaOH solution. Some of this solution reached the stormwater management system and raised the pH in the oil and grease skimming ponds. Because of the potential impact on Outfalls 001 and 004, these ponds were isolated and the water neutralized before being discharged. The incident was reported to the National Response Center (NRC) and NYSDEC in a timely fashion and there were no injuries and no noticeable impact on the environment. The NRC issued Incident Report Number 1096363 and NYSDEC issued Spill Report # 1406697 in response. Order on Consent R9-20141203-96 was executed amongst the company and NYSDEC, and required certain injunctive relief to be undertaken in response to the spill, including updates to this BMP Plan.

9.0 BEST MANAGEMENT PRACTICES

Although the potential for a significant release of toxic or hazardous pollutants to State waters is extremely low, TCC has established a number of BMPs that are currently in place and discussed in this section. These BMP's also apply to the release of petroleum and derivative products to the land or navigable water of the State. To the extent applicable, these BMPs follow the order listed in the SPDES Permit Special Conditions-BMP section.

9.1 RESPONDING TO AND REPORTING OF BMP INCIDENTS

Releases of petroleum and derivative products at the Facility shall be evaluated with respect to the NYSDEC's oil spill reporting policy:

All petroleum spills that occur within NY State must be reported to the NYS Spill hotline (1-800-457-7362) within 2 hours of discovery, except spills that meet all of the following criteria:

1. The quantity is known to be less than 5 gallons.
2. The spill is contained, and under the control of the spiller.
3. The spill has not, and will not reach the State's water or any land.
4. The spill is cleaned up within 2 hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved or impermeable surface, such as asphalt or concrete. A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable.

TCC maintains the following "In-Plant Spill Action Plan" which outlines all measures taken in the case of a spill, including all required reporting.

During Regular Business Hours:

1. The person discovering a spill shall report the spill to a supervisor immediately. Two-way radio communication shall be used to notify all other supervisors that an emergency exists.
2. The first responder(s) shall attempt to secure the source(s) of discharges, provided that doing so will not put anyone in harm's way.
3. Appropriate action shall be taken to prevent discharges from entering a sewer system.
4. The Environmental Manager or designee shall inspect the incident area to coordinate clean-up operations.
5. Excessive accumulations that build up on the surface of the ponds shall be skimmed by one of the following contractors:

GEI:	716-366-3141
Elmwood Tank & Piping Co.:	716-694-0106
All Wash:	716-458-3950
National Vacuum Corp.:	716-773-1167

6. The Environmental Manager is responsible for informing the appropriate governmental agencies of the incident.

7. In the event of a release that poses a sudden threat to public health or the environment, the NRC is to be called first.

National Response Center: 800-424-8802
U.S. Coast Guard: 716-846-4168
Environmental Protection Agency: 732-548-8730
NYSDEC: 716-851-7220 or 800-457-7362 (Albany)

Weekends and Nights

1. The person discovering a spill shall immediately inform the General Foreman.
2. The General Foreman shall initiate actions to secure the sources and contain the discharged material.
3. The General Foreman shall call the following persons in sequence until one has been reached:

VP Environment: Ed Dinsmore (716) 418-5612
(716) 886-2627

VP Operations: Bob Kolvek (716) 512-0061

Plant Manager: Pat Cahill (716) 550-1534

4. The above person contacted shall direct clean-up operations and shall inform the appropriate governmental agencies of the incident.

Sanitary Sewer-Accidental or Slug Discharge

TCC has reviewed chemical, as well as petroleum and derivative, storage in terms of type, volume, spill potential, and proximity to sanitary sewers. This review has shown a very low risk to the sanitary sewer from either of these storage schemes.

There are currently only two chemical storage tanks in service, and both are diked with no access to the sanitary sewer. Mobile sources (i.e., truck tankers) would need to have a release in very close proximity to the location of a sanitary sewer manhole for chemicals

to enter the sewer system. Spills in the process area would be conveyed to and held by the concrete settling/skimming ponds (lagoons).

Storage of petroleum and derivative products include both stationary and mobile sources. Facility personnel are aware of potential concerns associated with releases of these materials to the sanitary sewer system, and have been instructed to avoid direct placement of potential sources in areas with direct discharge capability.

Cleaning or biocide materials are stored in containers of 5 gallons or less. These containers represent the largest risk of release to the sanitary sewer.

Normal sanitary sewer flow is continuous and not of a batch discharge type. Nonetheless, in the event of an abnormal situation, or discharge in violation of 40 CFR 403.5, TCC would notify the POTW of the upset. Such notification would be done by phone to Mr. Paul Morrow at (716) 693-4900. A written review of the incident would be prepared and sent by regular mail to the contact at the POTW.

9.2 RISK IDENTIFICATION AND ASSESSMENT

TCC has identified all of the toxic/hazardous pollutants (as defined in the BMP section of the Facility's SPDES Permit) in use at the Facility. The use and handling of these materials is described in other sections of this BMP Plan.

A bulk hazardous materials list with associated Reportable Quantities has been developed and is included in Appendix B. A location map for the materials is also included in Appendix B, along with the associated SDSs. Materials that are stored in small quantities in the laboratories and machine shops and which have little-to-no potential to reach receiving waters in the event of a spill are not included. Note, however, that TCC maintains a complete log of the SDSs for chemicals used on-Site in the Safety office.

9.3 EMPLOYEE TRAINING

Initial Spill Prevention and Notification Training is provided for all Facility employees and contract workers who have the potential to handle materials that contain toxic/hazardous pollutants (i.e., WAL, oils) or to respond in the event of a spill of these materials. The training is provided upon start of employment, and an annual Hazardous Waste Operations and Emergency Response (HAZWOPER) refresher course.

In addition, annual refresher training is provided to any employees who work in proximity to the materials stored outside in the process area and who would have the possibility of responding in the event of a spill.

Facility operators receive initial training specific to his or her job requirements, including the need to perform daily vehicle inspections (see App. A-1) of Facility vehicles. These daily inspections prior to use, will identify potential sources of release, and will allow a rapid response to any release that occurred since the last time the vehicle was used.

Facility operators whose job responsibilities include use, operation, inspection, or oversight of storage tanks receive proper training on the operation of such tanks, including proper valve positioning and requirements relative to in-place secondary containment, and inspection requirements under applicable bulk storage regulations and this BMP Plan.

9.4 INSPECTIONS AND RECORDS

The Facility performs the following regular inspections using the forms found in Appendix A:

1. The Daily Vehicle Inspection Form (TCC-036-79, App. A-1), is utilized by all operators prior to, and after, the operation of any Facility vehicle to identify potential sources of release.
2. The Tar Loading Report (App. A-2) is completed by byproduct operators for every load of tar transferred from tar storage. This loading report includes the performance of specific actions to prevent the recurrence of the spill identified as No. 1304471.
3. The Process Wastewater Inspection Form is filled out by the Environmental Manager, or designee, on a monthly basis (see App. A.3). See Section 7.0 for further discussion.
4. Outfalls are inspected at least on a weekly basis using the Outfall Inspection Form (see App. A.4) and maintained by Environmental personnel, per the recordkeeping protocol.

5. A visual inspection of storage and containment areas (e.g., areas storing hazardous materials, petroleum and/or derivatives, etc.), including pipelines, tanks, and secondary containment systems, is performed and recorded (see App. A-5) by the Environmental Manager, or designee, using the Storage and Containment Inspection Form (see App. A.5). These records are maintained by the Environmental Department. Any deterioration of the curbing or containment walls will be promptly repaired. Any leaking tanks or piping within containment areas will also be promptly repaired.

In addition, Facility operators are to notify their supervisor or Environmental department staff upon the identification of a maintenance and/or repair issue regarding any issue associated with storage and containment areas.

6. The stormwater collection system is to be visually inspected on a monthly basis by a representative of the Environmental department to ensure compliance with the original design bottom elevation of the stormwater management control system components, as identified in the "Engineering Report for Outfall 002 Stormwater Management Improvements," dated October 2010, as well as the "Supplement No. 1 to Outfall 002 Engineering Report," dated July 10, 2011.

The visual inspection specifically include the Facility's catch basins, underdrains, and milled asphalt roads surrounding the perimeter of the coal pile/coke storage areas, as well as the components of the stormwater management control system – *i.e.* sedimentation pools, the north drainage swale, north ditch, south ditch, and stormwater pond. As part of the visual inspections, Environmental personnel will review the level of accumulated breeze, coal, coke and related materials surrounding the catch basins, underdrains, and milled roads, as well as accumulated sediment and vegetation within the stormwater management control system; in each such case, excess material is to be removed within 7 days of detection. The results of the visual inspections are to be recorded on the Stormwater Sedimentation Inspection Form (see App. A-6). All deficiencies are to be reported immediately, and appropriate repairs made in a timely fashion.

The inspection frequency will be twice per month from April 1 through June 30, *i.e.*, there will be two inspections in April, May, and June each year.

The stormwater collection system is to be inspected within 3 days of a rain event that is greater than 0.5 inches, based on data collected from a local weather station.

The results from all inspections are to be included in the monthly Discharge Monitoring Report.

7. The Mix Pad is to be inspected on a monthly basis by the Operations Manager, or designee. The results are to be recorded on the Mixing Pad Inspection Form (see App. A-7). All deficiencies are to be reported immediately, and appropriate repairs made in a timely fashion.

In addition to the weekly and monthly inspections, visual inspection of pipelines, flanges, joints, elbows, packings, valves, supports, and pumps are performed routinely by departmental supervisors and the operating personnel. Staged rail cars and equipment using petroleum or derivative products (e.g., vehicles, loaders, hydraulic equipment) will be regularly inspected for leaks prior to, and subsequent to, use. All potential leaks and/or abnormalities with regard to areas or equipment storage, and/or the handling of hazardous materials and petroleum or derivatives are to be reported to the Department Supervisor for repair and/or clean-up. Inspection records are a part of the byproduct department daily report and/or department logbook.

Additionally, operating personnel and supervisors are instructed to be alert for spills or signs of spills while in the course of their normal activities. They are to notify their supervisor for notification to the appropriate personnel for scheduling corrective action. Appropriate Facility personnel will be utilized to address any necessary repairs of equipment, containment or vehicles.

Applicable records are kept at least 5 years and are part of the BMP plan.

9.5 PREVENTIVE MAINTENANCE

Material storage tanks and pipelines are inspected daily by operating personnel. In addition, the supervisor is responsible to perform his own daily inspection of the tanks and pipelines. Any abnormalities identified by supervisors or operating personnel shall be repaired as soon as possible. Key pumps and/or valves are rotated with spares or exercised to ensure proper continuous operation.

TCC has a Preventive Maintenance (PM) program to periodically evaluate, and subsequently maintain, Facility vehicles and operational equipment.

Certain areas of the Facility that are utilized for fueling and maintenance of equipment and vehicles are part of a remedial effort that is being carried out by TCC under a

stipulation agreement with NYSDEC as a response to Spill No. 1207205. Once the remedial effort is completed, additional changes to these areas are expected. At such time, revisions to this BMP Plan will be implemented for these areas. In the interim, fueling and maintenance of Facility equipment and vehicles will be performed in designated areas with high Facility traffic that are regularly inspected for the presence of any leaks or spills, and will be closely monitored in conjunction with the terms of this BMP Plan.

9.6 GOOD HOUSEKEEPING

Good housekeeping is essential to TCC operations and is stressed throughout the Facility. Personnel in each operational area are responsible for maintaining proper respective housekeeping and coordinating with necessary Facility personnel to address any issues or abnormalities. In order to maintain the outside yard area, the paved areas are mechanically swept on a regular basis; while the storage areas are watered down as necessary to reduce dust on unpaved travel lanes.

Any leaks or spills of petroleum or derivative product from any source will be reported to the proper Facility personnel for addressing as soon as possible. Secondary containment areas will be inspected in conformance with the requirements of Section 9.4, and shall be addressed to properly remove and dispose of material and/or product that may accumulate in such areas.

Sumps are pumped out either continuously or before becoming surcharged. In the event of a storm or snow melt event, sumps will be pumped out expediently, and the containment area cleaned to remove any oil or debris from within the diked or curbed area.

The tar decanter hopper provides containment at its source for coal tar sludge generated from the process. Any deterioration of the coal tar sludge containment system will be promptly repaired. Any coal tar spills onto areas surrounding the tar decanter hopper will be promptly cleaned up.

Additional housekeeping activities associated with the proposed coal pile stormwater runoff plan of action are discussed in Section 9.12.

9.7 MATERIALS COMPATIBILITY

The potential for reactive materials to come into contact with each other is minimized at the Facility by storing the materials in separate areas. The Facility is also cognizant of the need to utilize proper containers for oil, raw materials, and other materials in use at the Site. The materials that are considered reactive include ammonium hydroxide, sodium hydroxide, and sulfuric acid, and are listed on the Bulk Hazardous Materials List found in Appendix B.

9.8 SECURITY

The plant employs a sufficient number of security personnel to ensure roving security protection 24 hours a day, 7 days a week. The Facility is fenced and plant gates are locked and/or staffed. Since the plant operates continuously, a General Foreman is on duty at all times.

Storage tank valves that would permit the outward flow of the tank are securely closed and locked when not in service or in standby service and operated by authorized persons only. Valves are to be visually inspected upon use to ensure there are no concerns associated with potential release of the stored material.

All pump controls are located at operating sites accessible only by authorized personnel within visual contact of the loading area.

Loading/unloading connections of oil, chemical, petroleum, and wastewater pipelines are securely blanked when not in service.

Facility lighting in all areas where oil and chemicals are present, including loading/unloading areas, process tanks, storage tanks, and ponds, is adequate for detection of spills and to assist in the prevention of acts of vandalism during night hours.

9.9 SPILL PREVENTION & RESPONSE

As mentioned in Section 5.0, the Facility has prepared a comprehensive SPCC Plan for the prevention of oil discharges to the waters of the State. All employees are trained to notify the Environmental Manager in the event of a spill in accordance with the requirements of Section 9.1.

All spills, regardless of size or operations being conducted, will be addressed immediately. Leaking equipment will be shut down immediately upon identification, and subsequently repaired as soon as possible. Appropriate Facility personnel will be contacted to perform the repairs and address any associated releases.

Operating personnel are trained and required to be proficient in the operation and maintenance of the equipment. This also includes proper methods of handling an emergency situation applicable to pollution control laws, rules, and regulations in conformance with this BMP Plan.

The responsibility for spill prevention and control is delegated to the Environmental Manager and the BMP committee.

In the event of a spill that generates material from on-Site cleanup efforts (e.g., sorbent material, impacted soil, etc.), the Environmental Manager will confer with outside waste management consultants regarding the nature of the waste in order to determine the proper reuse, recycling and/or disposal method. See Section 9.10.

Spill prevention briefings are conducted with operating personnel to assure adequate understanding of the BMP, SPCC Plans, and related regulations.

Additional details regarding spill prevention measures for petroleum and derivative products, and TCC's spill countermeasure plan are presented in the Facility's SPCC Plan.

9.10 MANAGEMENT OF WASTE MATERIALS

The procedures for handling waste materials in the event of a spill or release of chemicals, hazardous substances, or oil during routine operations are as follows:

1. Small releases of petroleum products (typically lubricating/cutting oils) are typically managed by local personnel.
 - a. Dike ahead of spill with speedi dry or other suitable absorbent material to prevent migration into sumps, ditches, and drains.

- b. Apply appropriate amount of breeze¹, speedi dry or other suitable absorbent material to the spilled material to absorb all liquid.
 - c. Sweep and scoop all spill cleanup residues into approved containers for subsequent characterization and subsequent reuse, recycling and/or disposal.
 - d. Notify the Environmental Manager as soon as possible.
- 2. Larger releases of petroleum products (typically lubricating/cutting oils) is beyond the scope of local personnel.
 - a. Dike ahead of spill with suitable absorbent material to prevent migration into sumps, ditches, and drains.
 - b. Immediately contact the Environmental Manager to request additional help and resources.
- 3. Releases of chemicals and hazardous substances.
 - a. Immediately contact the Environmental Manager to request additional help and resources.
 - b. Handle all releases of chemicals and hazardous substances in accordance with recommendations found on manufacturer's safety data sheet.
 - c. Appropriate training and personal protective equipment may be required to deal with chemical releases.
 - d. All cleanup material must be accumulated in appropriate containers for characterization and subsequent reuse, recycling and/or disposal.

9.11 MANAGEMENT OF RUNOFF

The dikes around process storage tank areas are constructed to contain at least the volume of the largest tank with freeboard for precipitation. Any material collected

¹ Beneficial Use Determination (BUD) #1106-9-15 was granted by NYSDEC on July 2, 2014 allowing the Facility to use breeze as a speedi-dry alternative.

within the dikes is pumped back into the operating system for treatment with Facility wastewater.

Water collected in the diked area around the EQ tanks is pumped into the East Tank (Tk#1) for settling purposes. From there, it flows by gravity to the West Tank (Tk#2). It then either overflows into the effluent line or is sent for filtering. After that it is sent for pH adjustment and monitoring before being discharged to the Town of Tonawanda under the Town Permit.

Stormwater in the process area that falls in undiked areas is routed to the two concrete lined settling/skimming ponds (lagoons) via the plant sewer system, prior to treatment (oil separation) and discharge through Outfall 001. The lagoon system has been designed to remove coal fines, along with incidental amounts of oil and other materials that may enter the catch basins in the process areas. The lagoon treatment system has been very effective in removing these materials.

Small amounts of coal tar sludge are transferred from the tar decanter hopper to the concrete containment pad located in the southeastern portion of the coal pile storage area. The containment pad (also known as the Mixing Pad) has a concrete floor and poured concrete walls. The coal tar from the tar decanter hopper is manually mixed with coal on the containment pad, and the mixture is then charged into the coal ovens. Precipitation that falls on the containment pad area is contained on the pad, where it either evaporates or is returned to the process area for treatment with Facility wastewater. Specific BMPs for the Mixing Pad are presented in Section 9.14.

9.12 COAL PILE STORMWATER RUNOFF PLAN OF ACTION

This section presents an overview of the Plan of Action (POA) for treatment of the coal pile runoff to ensure consistent compliance with SPDES limits at Outfall 002. The detailed design of the stormwater management upgrades is contained in the Engineering Report for Outfall 002 Stormwater Management Improvements, October 2010. The POA was implemented over the period of December 2010 to July 2011.

Please refer to Drawing CI-01 throughout the following POA discussion. Note that since the intent of this section is to provide an overview of the POA, drawing details that are included in the Engineering Report for Outfall 002 have been omitted from Drawing CI-01.

As part of the POA, a milled asphalt access road has been constructed around the perimeter of the coal pile/coke storage areas. The perimeter road provides a stabilized base for heavy equipment and vehicle traffic that operates in the area. It also serves as a type of containment system for the coal pile runoff, to separate coal pile activity from the ditches that route runoff to the stormwater detention pond. The perimeter access road also reduces the transportation of coal dust to other areas of the Site from vehicle tires. Design of the milled asphalt road incorporates an under-drain system to keep drainage off of the road and to protect the stone sub-base of the gravel road from pumping fines. The underdrain is tied into the storm drainage system. The coal pile runoff collection system consists of a series of catch basins and outlets located along the inside perimeter of the gravel road. The catch basins are slightly elevated above finish grade to reduce direct discharge of fine particles.

The ditches and piping that route coal pile stormwater runoff to the stormwater detention pond have been improved by deepening them to improve flow characteristics and to provide additional settling of suspended solids. The two main stormwater ditches, one on the north side and one on the south side of the coal pile storage area, both flow through sedimentation pools in order to meet the water quality volume requirements for sediment. The sedimentation pools are designed to work with the ditching and piping to reduce the velocity of the entering water to facilitate settling. The ditches and pipes were designed with a limited depth and are accessible by the gravel road in order to facilitate easy access to equipment for routine sediment cleanout.

The three sedimentation pools are designed to slow the velocity of the entering water in order to increase the deposit of suspended coal fines into these shallow pools. The pools are approximately 3 feet in depth in order to accommodate easy removal of sediment and coal fines using existing coal handling equipment. Sedimentation Pools No. 1 and No. 2 were designed to be inundated with water during storm events to slow the velocity of the water coming from the ditches and allow coal fines to settle out of suspension. From Sedimentation Pools No. 1 and No. 2, coal pile runoff flows to the Stormwater Pond, and from there it discharges through Outfall 002. The Stormwater Ponds were sized to contain the required 10 percent pretreatment requirement.

Sedimentation Pool No. 3 was constructed to manage and provide treatment for the stormwater flows discharged from the coal conveyor sump pit, the coal conveyor sump, the car dump pit area, and the concrete sump. Sedimentation Pool No. 3 was designed to provide water quality treatment during dry weather flow discharges from the sump areas, as well as peak flow attenuation during a wet weather 10-year 24-hour storm event. The design basis for Sedimentation Pool No. 3 was submitted to USEPA and to NYSDEC in the "Supplement No. 1 to Outfall 002 Engineering Report," July 10, 2011.

Surface runoff from the contributing watershed and discharges from the sump areas are routed into Sedimentation Pool No. 3. Flows from Sedimentation Pool No. 3 discharge to Sedimentation Pool No. 2, and then are routed to the Stormwater Pond. Sedimentation Pool No. 3 further enhances the Site stormwater management facilities by providing additional stormwater detention and peak flow reduction to both Sedimentation Pool No. 2 and to the Stormwater Pond.

The existing Stormwater Pond has been significantly expanded in order to provide for additional settling time for suspended solids. The pond was sized to attenuate the peak flow of a 10-year, 24-hour rainfall event and to provide the water quality management required in the New York State Stormwater Manual. The drainage controls have been designed in accordance with the NYSDEC Stormwater Management Design Manual. The pond was designed with sufficient available storage to handle both the water quality volume and peak flows from a high frequency storm event.

9.12.1 STORMWATER IMPROVEMENT BMPS

The BMPs associated with the management and treatment of coal pile runoff include:

- The need to clean the various components of the stormwater treatment system will be triggered by monthly measurements of sediment levels per the Stormwater Sedimentation Inspection Form (see App. A.6). Sediment level gauges (steel beams) have been installed in the detention basin and in Sedimentation Pools #1 and #2. Sediment levels will be measured at these gauges and at other predetermined locations (e.g., the top elevation/surface of various gabion baskets) as depicted on Figure 9.1, Sedimentation Level Measurement Locations. During the spring months (April, May, and June) when vegetative growth is most prevalent, the inspections per Appendix A-6 will be performed on a bi-monthly basis, and within 3 days of a rain event equal to, or greater than 0.5 inches, as measured at a local weather station.
- Accumulated sediment will be removed from the ponds, pools, ditches, and swales when the measured depth to sediment reaches the "Cleanout Depth" as indicated. Accumulated sediment will be removed from upstream of the gabion basket inspection points in the north and south ditches at least once per year, or more frequently as indicated by the sediment measurements. The volume of sediment removed will be recorded on the Inspection Form, and is to be removed within 7 days of identification from the visual inspection.
- Gabion baskets have been installed at several locations in the South Ditch to act as stone check dams and to facilitate containment and subsequent cleaning of coal fines

from production activities. The areas adjacent to and around the gabions shall be cleaned when indicated by the Appendix A-6 inspections. Ditch sediment shall be removed at least twenty (20) feet on both the upstream and downstream sides of the gabions and volume recorded. Upon completion of sediment removal, the baskets shall be flushed with high-pressure water until the flow from the gabion is relatively clear. Gabion baskets shall be cleaned in the spring and fall by flushing with clean water and when required by the Appendix A-6 inspections.

- Gabion baskets located within Sedimentation Pool #3 will be inspected per Appendix A-6 and cleaned out within 30 days of a monthly inspection that indicates debris and/or sediment accumulating within the basket. Cleanout of the gabion baskets located within Sedimentation Pool #3 will consist of flushing the baskets with high-pressure water until the flow from the gabion is relatively clear.
- Accumulated coal fines and sediment removed from gabion baskets by the flushing process described above will generally be allowed to settle within the upstream portion of the ditch, pool or swale in which the gabion has been installed. The amount of coal fines and sediment flushed from the gabions is expected be minor. In the event that the gabion flushing is done prior to a ditch, pool or swale cleanout (in accordance with the requirements of Appendix A-6), the flushed, settled sediments will be cleaned from the ditch, pool or swale and mixed into the existing coal piles.
- The milled asphalt road will be maintained and sprayed with water as needed to control dust and to limit the transportation of fines to other areas of the facility.
- All vehicles will be required to stay on the improved road surfaces for any activities other than loading or unloading on the coal/coke storage areas.
- The catch basins and under drains for the road will be maintained on an as needed basis, and shall be cleaned thoroughly, on an annual basis by flushing through the clean-outs and the removing sediment in the catch basins.
- Any coal fines removed from the sedimentation pools, stormwater detention pond, ditches, swales, and other stormwater conveyance pipelines will be mixed into the existing coal piles.
- Vegetation in the swales and ditches will be visually inspected in accordance with the requirements of Appendix A-6, and controlled to prevent excessive ponding in areas not designed for it. Vegetation removal is to occur within 7 days of identification from a visual inspection.

9.13 PROCESS WASTEWATER SYSTEM PLAN OF ACTION

This section presents the Plan of Action developed as the result of a wastewater system audit performed at the Facility in early 2010.

Process Wastewater System Findings:

All containment sumps on the North end of the process area are pumped to the Tar Decanter. Sumps located in containment areas around the Ammonia Still and Phenol Pump House are pumped directly to the WAL tanks, where they are mixed with the process wastewater and routed for treatment.

Transfer of process wastewater from the surge tank to the WAL tanks is confined to a single aboveground pipe. Likewise, flow from the Ammonia Still Wet Well to the Equalization Tanks is also through a single aboveground pipeline.

Manholes 26 and 27, shown on Figure 3.3, originally discharged to the Ammonia Still Wet Well. Prior to the installation of the Equalization Tanks, the Ammonia Still Wet Well was the end of the treatment process, and the flow from the Wet Well was mixed with the sanitary flow at Manhole 10A. Since the addition of the Equalization Tank treatment process, Manholes 26 and 27 have been completely disconnected and segregated from the Ammonia Still Wet Well. TCC personnel indicate that Manholes 26 and 27 remain connected to each other through a single pipe, but are not connected to any other manholes or underground piping.

Process Wastewater System Recommendations:

Manhole 26 is no longer used in any wastewater conveying process; however, it does surcharge with ground water and surface runoff, and is periodically pumped out to the process wastewater treatment system by TCC personnel. This method of handling groundwater collecting in Manhole 26 will continue.

Manhole 27 is located within a spill containment area, where it is utilized as a containment sump. Manhole 27 can be pumped to the Facility's wastewater treatment system if necessary, but levels in the sump are typically low.

9.14 MANAGEMENT OF CONCRETE MIXING PAD

As described in Section 9.11, small amounts of coal tar sludge are transferred from the tar decanter hopper to the concrete containment (mix) pad located in the southeastern portion of the coal pile storage area. The coal tar sludge from the tar decanter hopper is manually mixed with coal on the containment pad, and the mixture is then charged into the coal ovens.

9.14.1 AVAILABLE STORAGE CAPACITIES

The mix pad walls are approximately 100 feet long by 60 feet wide by 4 feet high and made of concrete. Coal is typically staged on a 2 on 1 slope to a maximum height of 10 feet, which equates to approximately 1,400 cubic yards of storage space for the coal/tar mixture (accounting for 1 foot of freeboard at the sidewalls).

However, to allow for operational space within the mixing pad, only 2/3 of it is generally used at any given time. Therefore the maximum amount of coal/tar mixture that can be placed on the pad is approximately 950 cubic yards.

The coal material is typically stored near the back of the mixing pad, allowing for operating room near the entrance and front portion of the pad. Therefore, at maximum coal/tar storage volume, the minimum distance from the coal/tar mixture to the entrance of the pad would typically be 33 feet. TCC will leave a 2 foot high berm at the entrance to the pad, meaning that almost 4000 cubic feet of space, or 30,000 gallons, is available for water storage.

In the event of a "severe storm," assumed to be a 25-year storm event (i.e., approximately 4 inches of water in a 24-hour period), approximately 15,000 gallons of water would fall in the pad. Considering that this is only half of the capacity available, there is at least one foot of free board available at all times. Note, that this doesn't take into account the pore space storage within the coal/tar mixture. A conservative estimate of pore space is 5%, which would provide an additional 9,500 gallons of water storage.

Normally, small piles of coal are stored against the sides and back concrete walls of the mixing pad, and form a buffer zone for the operational equipment within the mixing pad. The height of these piles does not extend above 3 feet, leaving approximately one foot of freeboard near the concrete walls. At the maximum coal/tar mixture volume (utilizing 2/3 of the available storage space within the pad), the minimum distance from the material to the mixing pad walls would be several feet.

9.14.2 MIXING PAD RELEASE PREVENTION

The following specific measures will be taken to prevent a release of coal/tar mixture and/or rainwater from the mixing pad:

- Only store coal/tar mixture on 2/3 of the pad at any given time
- Maintain a minimum 6-inches of freeboard
- Continuously maintain a minimum 2 feet high berm at the pad entrance
- Remove liquids following a rainfall event (see Preventive Maintenance below)

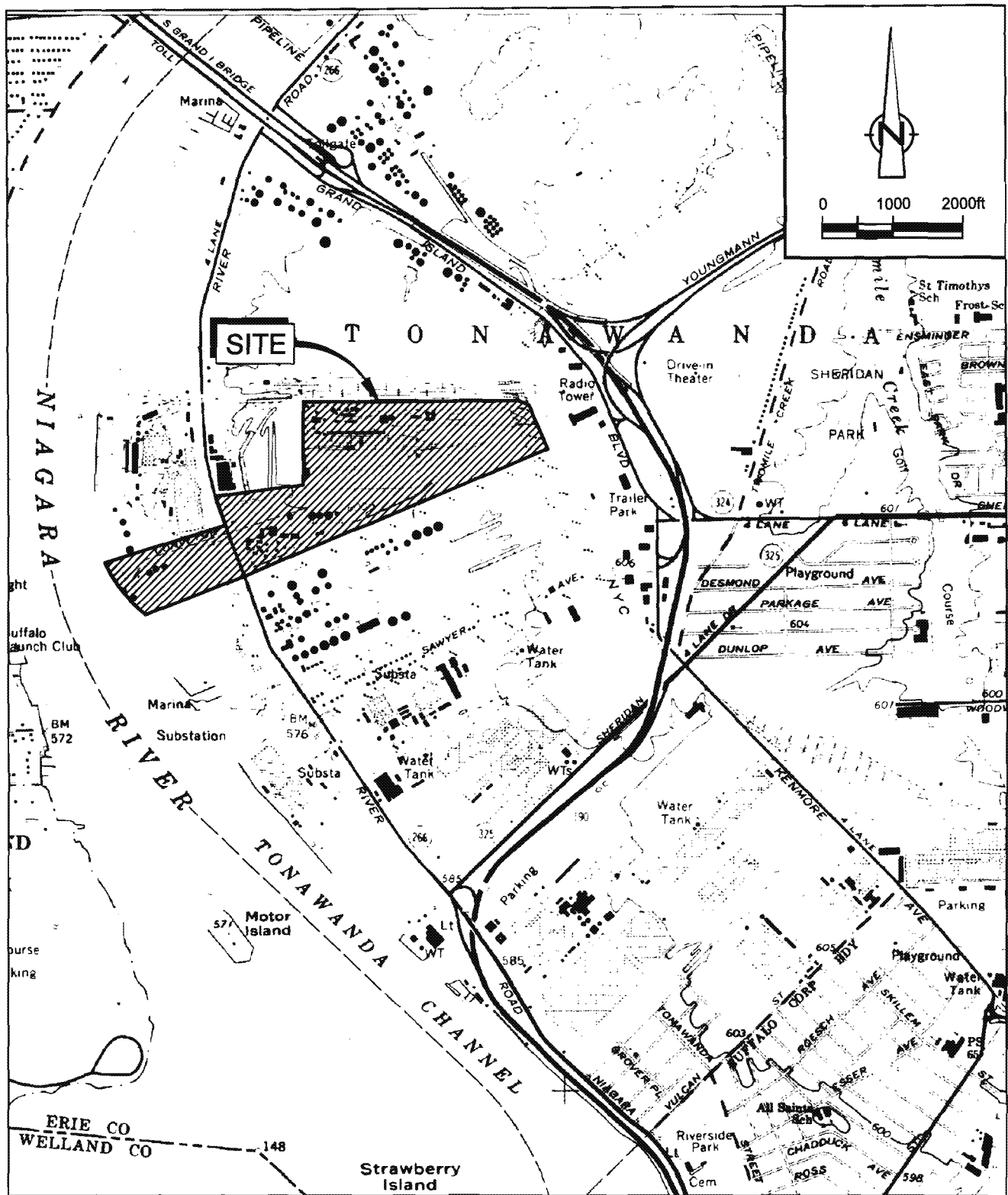
9.14.3 MIXING PAD BMPS

- *Routine Inspections* - Qualified Facility personnel will inspect the pad on a monthly basis. The inspections must include an evaluation of the pad and its ability to contain storm water and material (i.e., coal/tar). In addition, the inspection must include approximate measurement of the amount of liquid on the pad, observations of the amount and location of material stored on the pad, and observation of estimated freeboard. In addition, inspections will be conducted after a significant rainfall event (i.e., greater than 1 inches of rainfall). Inspections will be documented (see Appendix A.7 for the inspection form). Any deficiencies noted as part of the inspection must be corrected as soon as practicable, and within 7 days of the inspection.
- *Training* - Facility employees will be given instructions to regularly check the area. Employees will also be given procedures to follow in the event of a spill or leak in the mixing pad area. It is intended that all personnel will have a heightened sense of awareness concerning environmental hazards and potential pollutant sources at the mixing pad area. The training topics will generally include a review of the storm water pollution prevention goals and objectives, spill response, as well as BMPs to be utilized at the mixing pad.
- *Good Housekeeping* - The facility must keep the area surrounding the mixing pad clean and in an orderly manner, where such exposed areas could contribute pollutants to storm water discharges. Good housekeeping practices will be used to reduce the possibility of accidental spills and potential for storm water pollution.

- ***Preventive Maintenance*** - A good preventive maintenance program will be part of the routine inspection program and will include inspection and maintenance of the Facility vacuum truck to ensure that it can respond when storm water has accumulated on the mixing pad.

In the event that storm water has accumulated on the pad (greater than 2 inches deep covering a surface area greater than 50 percent of the open space of the pad), the facility will utilize the on-Site vacuum truck to remove accumulated liquid for discharge to the on-Site wastewater treatment facility.

The facility will maintain a continuous, minimum 2 feet high coal berm along the opening of the mixing pad opening to prevent storm water from migrating outside of the pad.



SOURCE: USGS QUADRANGLE MAP;
BUFFALO NW, NEW YORK



figure 2.1
FACILITY LOCATION
BEST MANAGEMENT PRACTICES PLAN
Tonawanda Coke Corporation

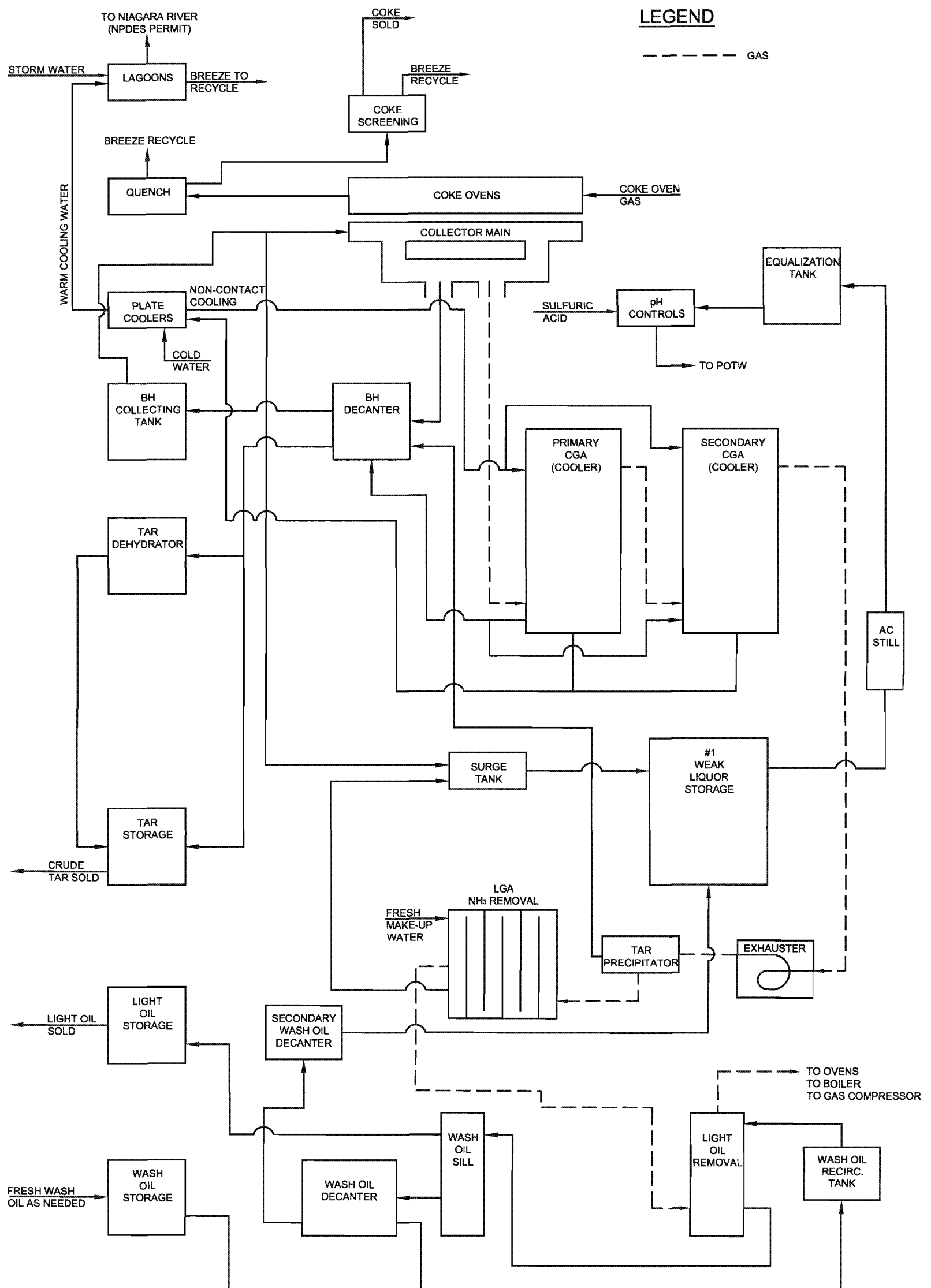


figure 2.2
 TYPICAL COKE AND BY-PRODUCTS PROCESS FLOW DIAGRAM

Tonawanda Coke Corporation



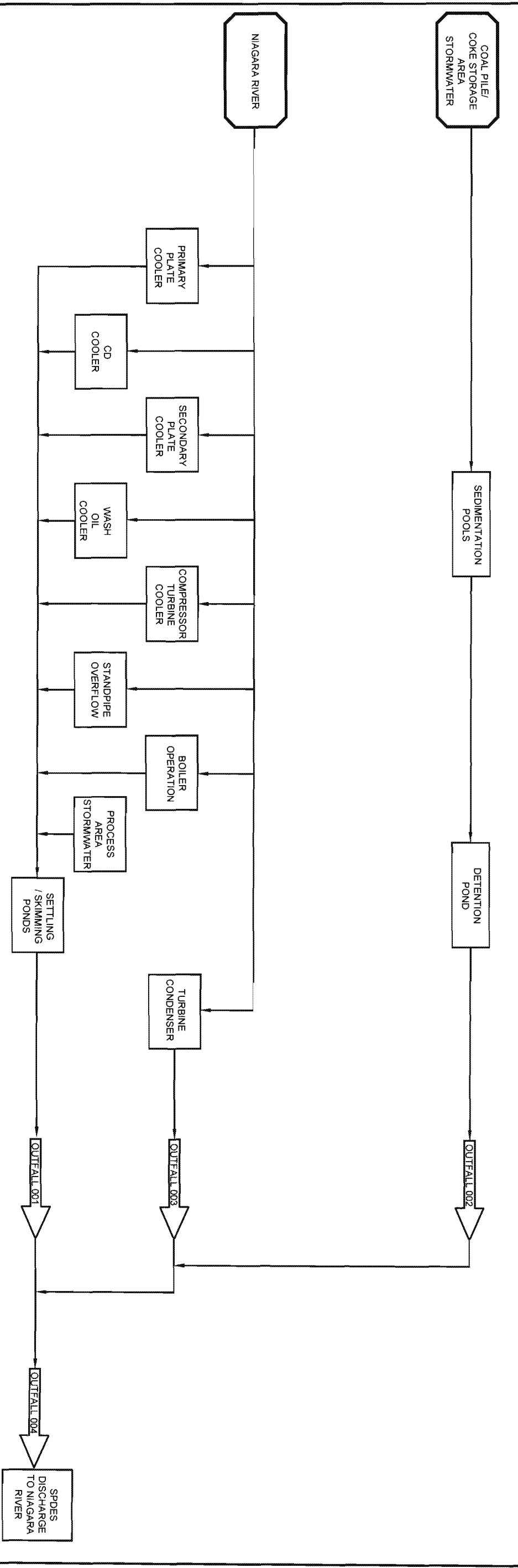
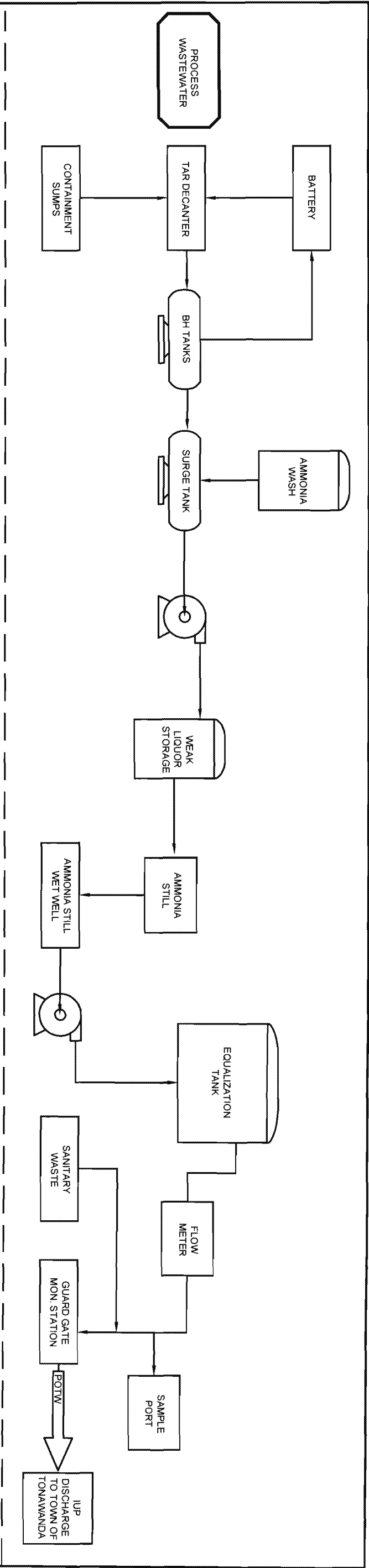
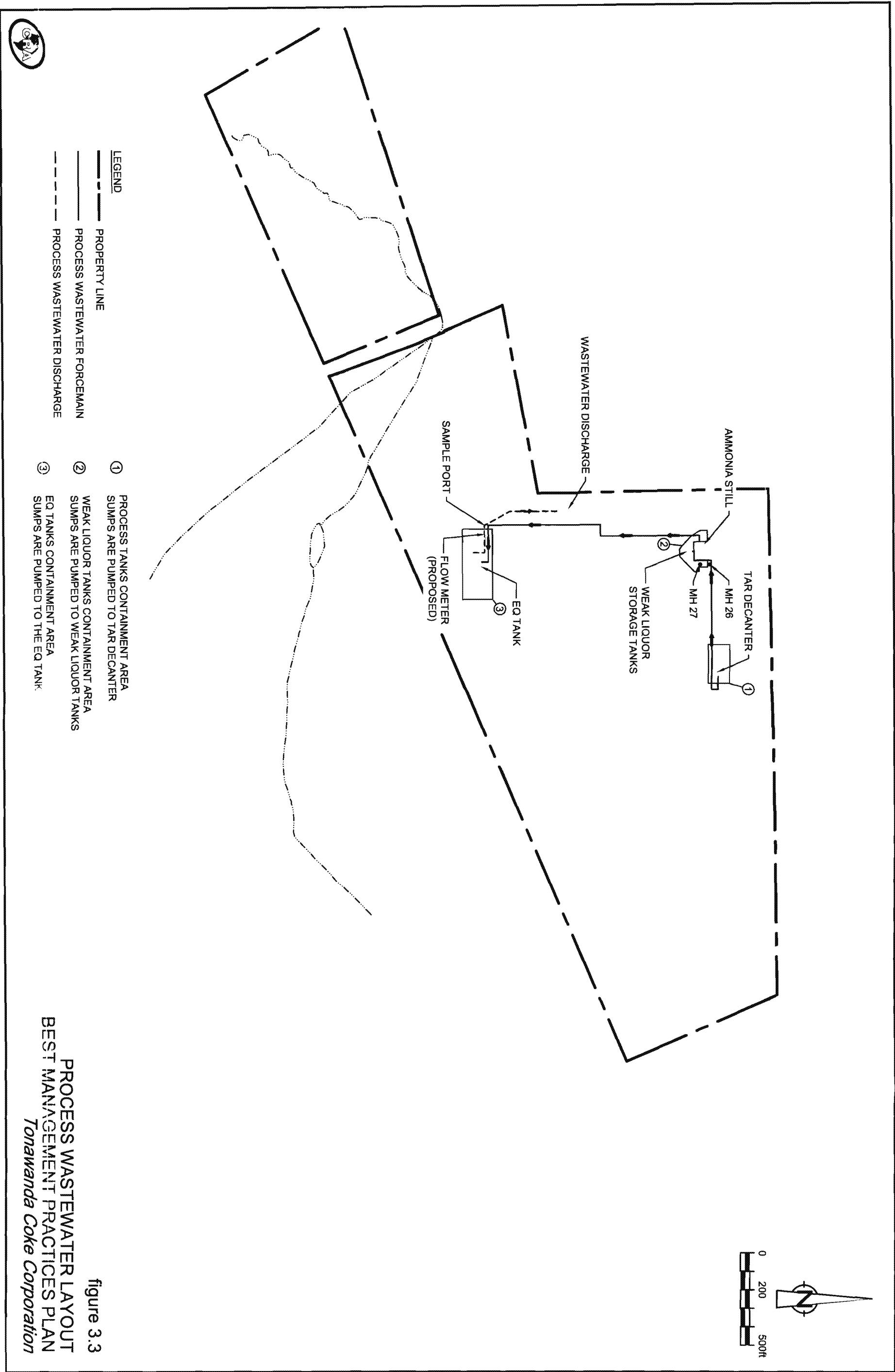
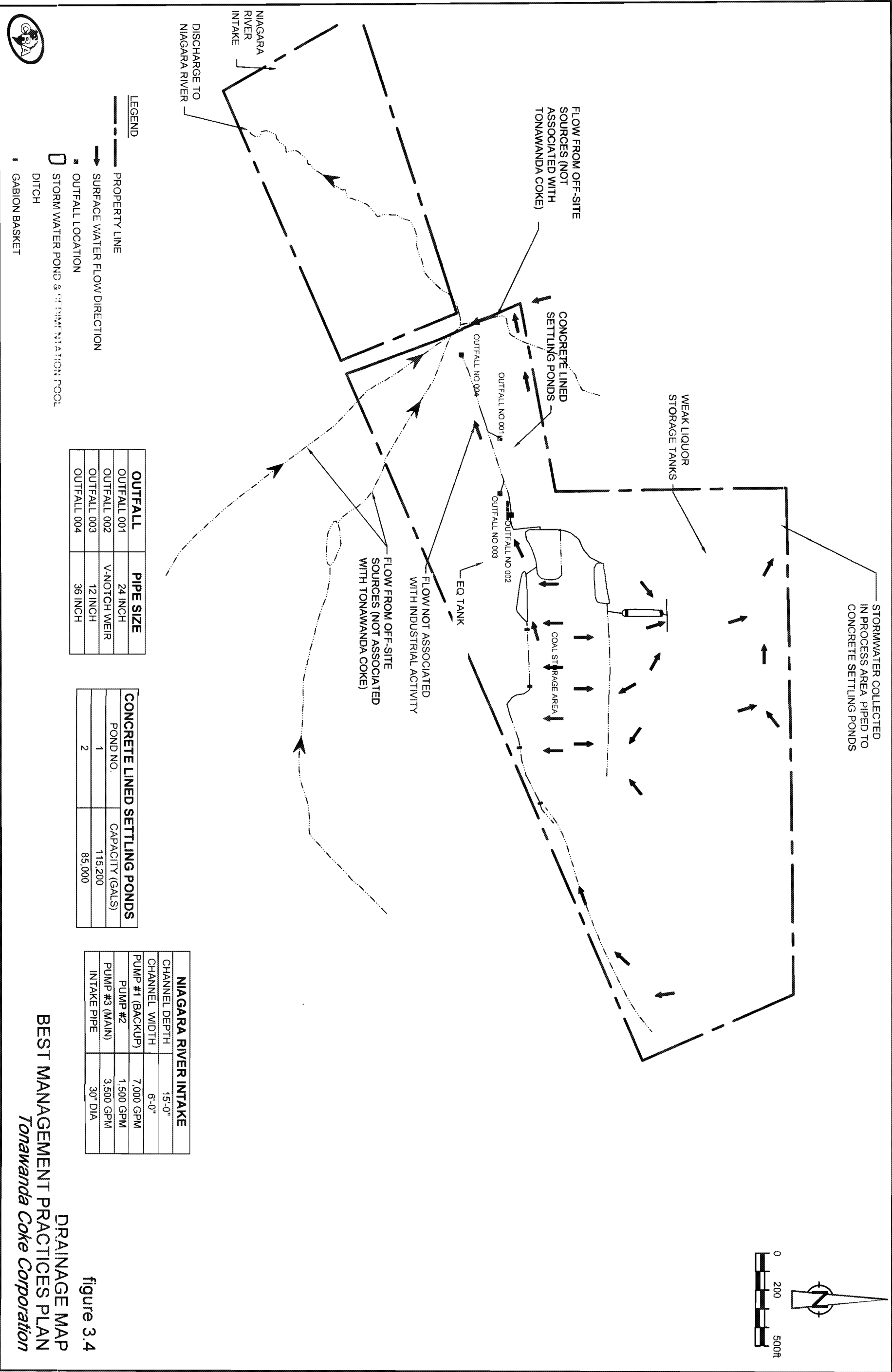


figure 3.1
WATER FLOW DIAGRAMS
BEST MANAGEMENT PRACTICES PLAN
Tonawanda Coke Corporation



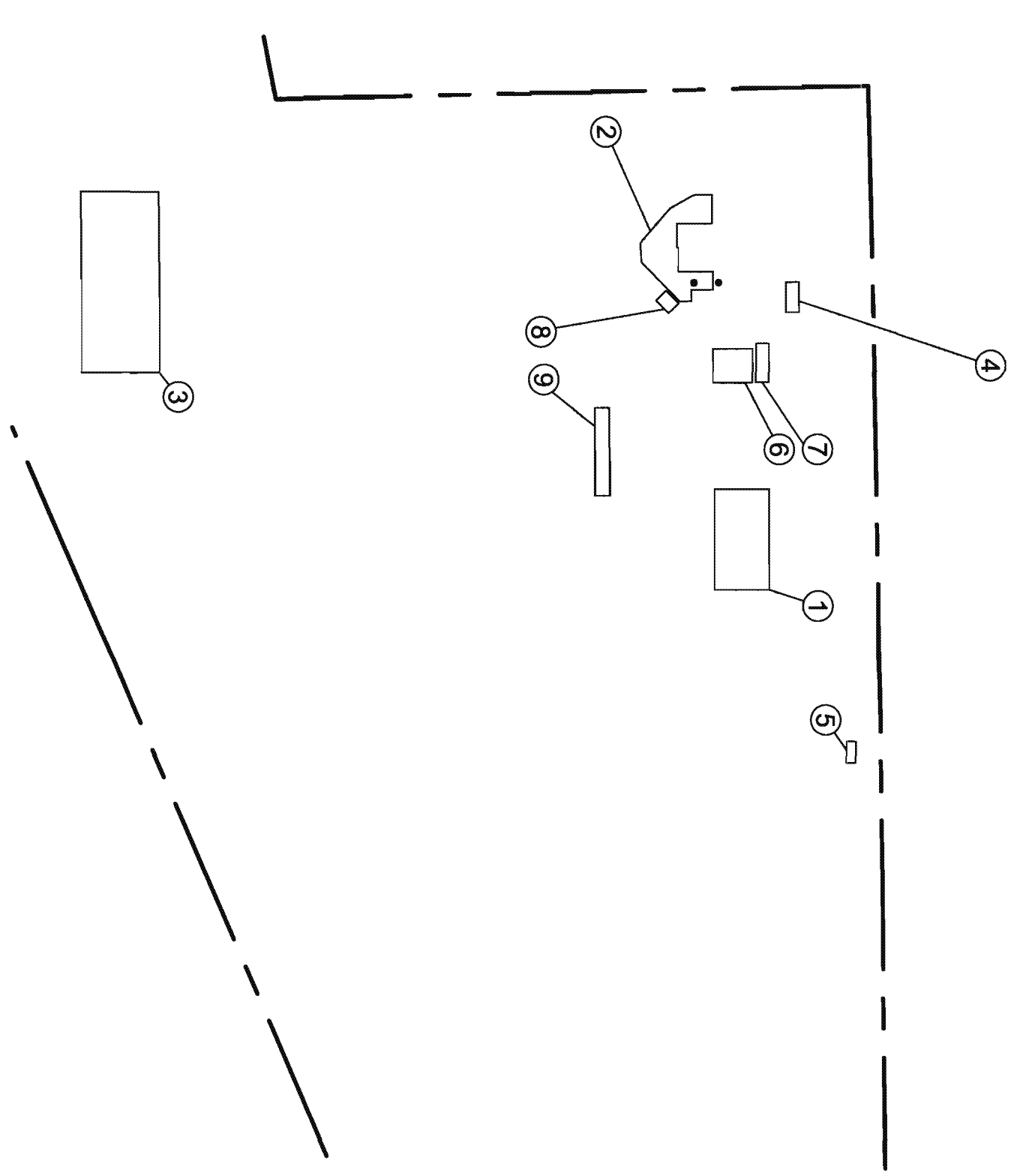
02428-00(013)GN-BU005 JUL 23/2010







02428-00(013)GN-BU008 JUL 29/2010



- LEGEND**
- | | | | |
|---|------------------------------------|---|--------------------------------|
| ① | PROCESS TANKS CONTAINMENT AREA | ⑥ | LIGHT OIL CONTAINMENT AREA |
| ② | WEAK LIQUOR TANKS CONTAINMENT AREA | ⑦ | TRUCK TRANSFER CONTAINMENT PAD |
| ③ | EQ TANK CONTAINMENT AREA | ⑧ | TRANSFER CONTAINMENT PAD |
| ④ | OIL HOUSE CONTAINMENT AREA | ⑨ | RAIL CAR CONTAINMENT AREA |
| ⑤ | DIESEL CONTAINMENT AREA | | |
- PROPERTY LINE

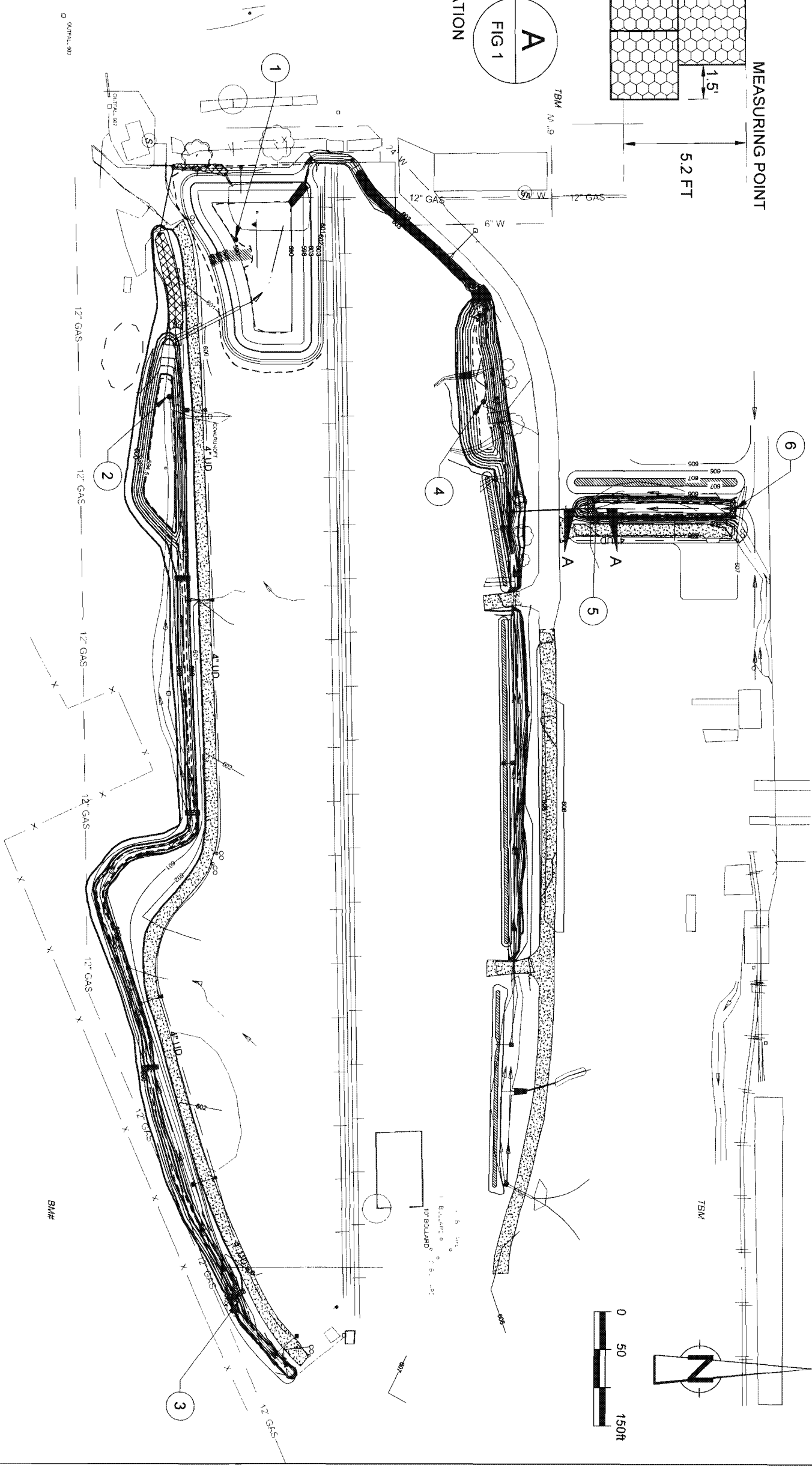
BULK STORAGE AND TRANSFER CONTAINMENT PLAN
BEST MANAGEMENT PRACTICES PLAN
Tonawanda Coke Corporation

figure 8.1

5.2 FT

FIG 1 NTS

POOL #3
MEASUREMENT LOCATION



STANDARD BOND

- 1 STORMWATER POND
- 2 SEDIMENTATION POOL #1 (SOUTH)
- 3 SOUTH DITCH
- 4 SEDIMENTATION POOL #2 (NORTH)
- 5 SEDIMENTATION POOL #3
- 6 NORTH DRAINAGE SWALE

13

- SEDIMENTATION GAUGE
- CATCH BASIN
- PERMANENT GABION BASKET

figure 9.1

**SEDIMENT LEVEL MEASUREMENT LOCATIONS
BEST MANAGEMENT PRACTICES PLAN
TONAWANDA COKE CORPORATION
TONAWANDA, NEW YORK**



Daily Vehicle Inspection Form



Box 5007
3875 River Road
Tonawanda, NY 14151

SPDES NO. NY-000 2399

Daily, before use

Date: _____
Time: _____
Vehicle: _____

Operator: _____
Shift: _____
Found plugged in? Yes/No Power washed? Yes/No

Item	OK	NOT Ok	Why	Action Taken
Battery				
Dashboard instruments				
Tires				
Head & tail lights				
Brakes				
Parking/chocked				
Air filters				
Pins				
Back-up alarm				
Wipers				
Starter				
Horn				
Radiator				
Windows				
Engine temperature				
Grease fittings/Drive shafts				
2-way radio				
Fire extinguisher				
Cab clean - NO GARBAGE!				
Visible leaks				

Remove from service immediately if leak detected

Supervisor Notified: _____

Fluid	Amount added
Fuel	
Engine Oil	
Hydraulic Oil	
Transmission	
Radiator	
Power Steering	

Additional Comments: _____

Operator Signature: _____

Supervisor Reading Report: _____

Tar Loading Report



Box 5007
3875 River Road
Tonawanda, NY 14151

SPDES NO. NY-000 2399

Every Load

Date:	_____	Load Number:	_____
Time:	_____	Customer:	_____
Carrier:	_____	Driver:	_____
Verifier:	_____	Signature:	_____
Truck #	_____	Clean?	Yes/No
		Valves Closed?	Yes/No

Warning signs in place?	Yes/No
-------------------------	--------

Chains in place?	Yes/No
------------------	--------

Loading arm tied down	Yes/No
-----------------------	--------

Personal Protective Equipment On?	Yes/No
-----------------------------------	--------

BP Operator:	_____	Signature:	_____
--------------	-------	------------	-------

Coal Tar Sample?	Yes/No	How taken:	_____
------------------	--------	------------	-------

Sample to Lab?	Yes/No
----------------	--------

Sampler:	_____	Signature:	_____
----------	-------	------------	-------

Process Wastewater Inspection Form



Box 5007
3875 River Road
Tonawanda, NY 14151

SPDES NO. NY-000 2399

Monthly

Date: _____	Inspector: _____
Time: _____	Title: _____

System:	Spills?		Leaks?		Observations:
	Yes	No	Yes	No	
Collection Sumps					Pumps operating?
Tar Decanter					
Surge Tank					
Pumps					Back-up pumps available?
Pre-still Piping					Insulation & freeze protection working?
Still					
Pump House & Sump					
Post-still Piping					Insulation & freeze protection working?
Acid & Injection Point					
Meter					Read out & recorder operating?
Sample Port					

Record any concerns, corrective actions taken, and any other indicators of pollution present.

Inspector signature: _____

Outfall Inspection Form



Box 5007
3875 River Road
Tonawanda, NY 14151

SPDES NO. NY-000 2399

Weekly

Date: _____	Inspector: _____
Time: _____	Title: _____

Outfall: _____				
Parameter	Yes	No	Characteristics	
Color	Color visible			Describe:
Clarity	Clear/transparent?			Clear/Milky/Opaque
Oil Sheen	Visible sheen?			Rainbow/Floating oil
Odor	Odor present?			Describe:
Floating solids	Anything floating?			Describe:
Suspended solids	Anything suspended?			Describe:
Settled solids	Anything settled?			Describe:
Foam	Foam present?			Describe:

Record any concerns, corrective actions taken, and any other indicators of pollution present.

Inspector signature: _____

Storage and Containment System

Inspection Form



Box 5007
3875 River Road
Tonawanda, NY 14151

SPDES NO. NY-000 2399

Monthly

Date: _____	Inspector: _____
Time: _____	Title: _____

Containment Area:	Spills?		Leaks?		Area Dry?		Debris Free?	
	Yes	No	Yes	No	Yes	No	Yes	No
Process Tanks								
Weak Liquor Tanks								
Eq Tanks								
Oil House								
Diesel Tanks								
Light Oil Tanks								
Truck Transfer Pad								
Transfer Pad (WAL tks)	Abandoned							
Rail Car								
Transfer Pad (Coal Hdlg)								

Record any concerns, corrective actions taken, and any other indicators of pollution present.

Inspector signature: _____

Stormwater Sedimentation Inspection Form



Box 5007

SPDES NO. NY-000 2399

3875 River Road

Tonawanda, NY 14150

Monthly*

BiMonthly - Apr, May, Jun

Inspector: _____						Date: _____			
Title: _____						Time: _____			
Inspection Point	Measure Point	Depth to soil (ft)	Cleanout Depth (ft)	Depth to Bottom (ft)	Debris Free?		Cleanout Vol Removed		
					Yes	No	Sediment	Vegetation	new Depth
Stormwater Pond	Top of Steel Beam		8.8	12.8					
Sedimentation Pool #1 (South)	Top of Steel Beam		5.0	6.5					
South Ditch	Top of Gabion Basket (E end)		1.5	2.2					
North Ditch	Top of Culvert Pipe		2.5	3.0					
North Drainage Swale	Top of N Gabion Basket (SP#3)		0.5	1.5					
Sedimentation Pool #3 (North)	Top of S Gabion Basket		3.0	5.2					
Sedimentation Pool #2 (Central)	Top of Steel Beam		5.3	7.3					
Catch Basin/Underdrs.									
Gabion Baskets									
Milled Access Road									
Record any concerns, corrective actions taken, and any other indicators of pollution present.									
<p>Note: All pond & ditch sediment/debris is to be removed within 7 days of discovery. Catch basins and underdrains are to be flushed on an annual basis.</p> <p>"I certify the information submitted is, to the best of my knowledge and belief, true, accurate, and complete."</p>									
Inspector signature: _____									

Mixing Pad Inspection Form



Box 5007 SPDES NO. NY-000 2399
3875 River Road
Tonawanda, NY 14151
Monthly

Date: _____	Inspector: _____
Time: _____	Title: _____

Location	Observations:	Yes	No
Area outside of Pad	Coal/tar material contained on Pad?		
	General housekeeping adequate?		
Entrance area to Pad	Berm intact and of adequate height?		
	Verify berm will prevent releases of stormwater		
Conditions at interior of Pad	General housekeeping adequate?		
	Verify material stored on less than 2/3 of Pad surface area		
	Verify no material is stored on or over concrete walls.		
	Verify freeboard (distance between top of coal and top of dike wall) is at least 6 inches.		
	Verify there is no accumulation of stormwater greater than 2 inches over 50% of pad surface area.		

Record any concerns, corrective actions taken, and any other problem areas.

Note: Significant stormwater accumulation is to be removed and put into the wastewater treatment system.

Inspector signature: _____

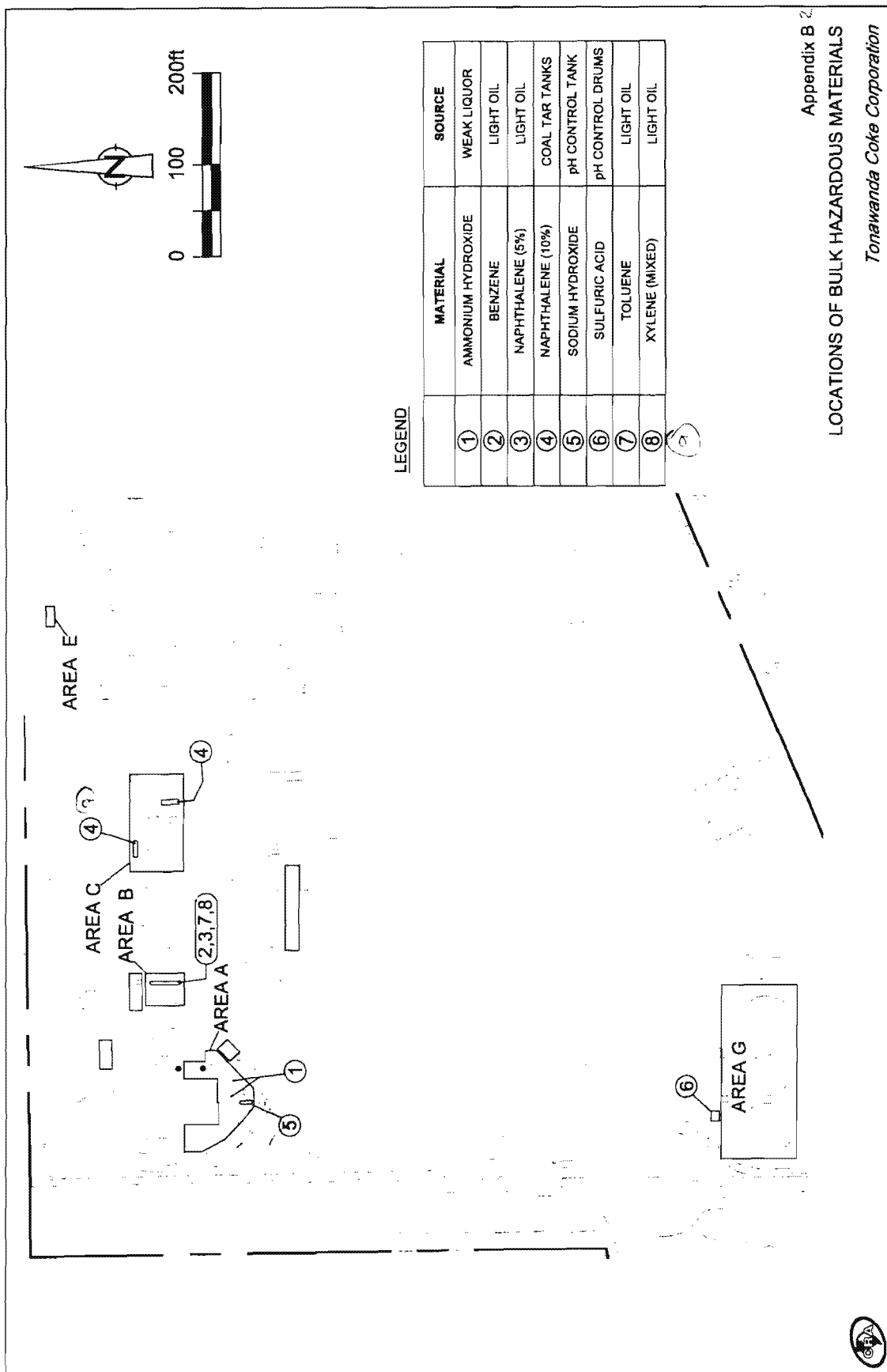


Box 5007
3875 River Road
Tonawanda, NY 14150

Material	CAS #	Reportable Quantity		Onsite Quantity (approx)		Location
		Pounds	Kilograms	Pounds	Kilograms	
Ammonium Hydroxide ¹	1336-21-6	1,000	454	13,400	6,078	B
Benzene ²	71-43-2	10	4.5	23,400	10,614	B
Hydrochloric Acid ⁴	7647-01-0	5,000	2,268	2,740	1,243	B
Napthalene (5%) ²	91-20-3	100	45	2,340	1,061	B
Napthalene (10%)	91-20-3	100	45	25,000	11,340	C
Sodium hydroxide ³	1310-73-2	1,000	454	24,000	10,886	I
Sulfuric Acid ⁴	7664-93-9	1,000	454	6,600	2,994	G
Toluene ²	108-88-3	1,000	454	7,020	3,184	B
Xylene (mixed) ²	1330-20-7	100	45	2,340	1,061	B

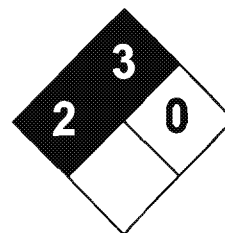
Notes:

- 1 Solution containing 4 g of NH₃OH per liter
- 2 Benzene, toluene, and xylene are combined in a light oil solution, that also contains some napthalene
- 3 NaOH is in a 50% solution
- 4 HCl and H₂SO₄ come in 55 gal drums





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Chemicals & Laboratory Equipment



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C₆-H₆

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Vigorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonosulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m³) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m³) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m³) [Canada] TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:

Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:

Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

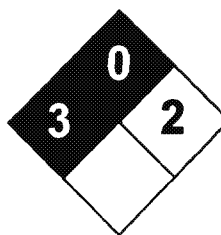
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Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	0
Reactivity	2
Personal Protection	

Material Safety Data Sheet

Sulfuric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sulfuric acid

Catalog Codes: SLS2539, SLS1741, SLS3166, SLS2371, SLS3793

CAS#: 7664-93-9

RTECS: WS5600000

TSCA: TSCA 8(b) inventory: Sulfuric acid

CI#: Not applicable.

Synonym: Oil of Vitriol; Sulfuric Acid

Chemical Name: Hydrogen sulfate

Chemical Formula: H₂-SO₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sulfuric acid	7664-93-9	95 - 98

Toxicological Data on Ingredients: Sulfuric acid: ORAL (LD50): Acute: 2140 mg/kg [Rat.]. VAPOR (LC50): Acute: 510 mg/m³ 2 hours [Rat.]. 320 mg/m³ 2 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged

contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion:

Products of combustion are not available since material is non-flammable. However, products of decomposition include fumes of oxides of sulfur. Will react with water or steam to produce toxic and corrosive fumes. Reacts with carbonates to generate carbon dioxide gas. Reacts with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively.

Fire Hazards in Presence of Various Substances: Combustible materials

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Metal acetylides (Monocesium and Monorubidium), and carbides ignite with concentrated sulfuric acid. White Phosphorous + boiling Sulfuric acid or its vapor ignites on contact. May ignite other combustible materials. May cause fire when sulfuric acid is mixed with Cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous (III) oxide, and oxidizing agents such as chlorates, halogens, permanganates.

Special Remarks on Explosion Hazards:

Mixtures of sulfuric acid and any of the following can explode: p-nitrotoluene, pentasilver trihydroxydianinophosphate, perchlorates, alcohols with strong hydrogen peroxide, ammonium tetraperoxychromate, mercuric nitrite, potassium chlorate, potassium permanganate with potassium chloride, carbides, nitro compounds, nitrates, carbides, phosphorous, iodides, picratres, fulminats, dienes, alcohols (when heated) Nitramide decomposes explosively on contact with concentrated sulfuric acid. 1,3,5-Trinitrosohexahydro-1,3,5-triazine + sulfuric acid causes explosive decomposition.

Section 6: Accidental Release Measures**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage:

Hygroscopic. Reacts. violently with water. Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23°C (73.4°F).

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 STEL: 3 (mg/m3) [Australia] Inhalation TWA: 1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 1 STEL: 3 (mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 1 (mg/m3) from NIOSH [United States] Inhalation TWA: 1 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Thick oily liquid.)

Odor: Odorless, but has a choking odor when hot.

Taste: Marked acid taste. (Strong.)

Molecular Weight: 98.08 g/mole

Color: Colorless.

pH (1% soln/water): Acidic.

Boiling Point:

270°C (518°F) - 340 deg. C Decomposes at 340 deg. C

Melting Point: -35°C (-31°F) to 10.36 deg. C (93% to 100% purity)

Critical Temperature: Not available.

Specific Gravity: 1.84 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 3.4 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:

Easily soluble in cold water. Sulfuric is soluble in water with liberation of much heat. Soluble in ethyl alcohol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability:

Conditions to Avoid: Incompatible materials, excess heat, combustible material materials, organic materials, exposure to moist air or water, oxidizers, amines, bases. Always add the acid to water, never the reverse.

Incompatibility with various substances:

Reactive with oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.

Corrosivity:

Extremely corrosive in presence of aluminum, of copper, of stainless steel(316). Highly corrosive in presence of stainless steel(304). Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Hygroscopic. Strong oxidizer. Reacts violently with water and alcohol especially when water is added to the product. Incompatible (can react explosively or dangerously) with the following: ACETIC ACID, ACRYLIC ACID, AMMONIUM HYDROXIDE, CRESOL, CUMENE, DICHLOROETHYL ETHER, ETHYLENE CYANOHYDRIN, ETHYLENEIMINE, NITRIC ACID, 2-NITROPROPANE, PROPYLENE OXIDE, SULFOLANE, VINYLIDENE CHLORIDE, DIETHYLENE GLYCOL MONOMETHYL ETHER, ETHYL ACETATE, ETHYLENE CYANOHYDRIN, ETHYLENE GLYCOL MONOETHYL ETHER ACETATE, GLYOXAL, METHYL ETHYL KETONE, dehydrating agents, organic materials, moisture (water), Acetic anhydride, Acetone, cyanohydrin, Acetone+nitric acid, Acetone + potassium dichromate, Acetonitrile, Acrolein, Acrylonitrile, Acrylonitrile +water, Alcohols + hydrogen peroxide, ally compounds such as Allyl alcohol, and Allyl Chloride, 2-Aminoethanol, Ammonium hydroxide, Ammonium triperchromate, Aniline, Bromate + metals, Bromine pentafluoride, n-Butyraldehyde, Carbides, Cesium acetylene carbide, Chlorates, Cyclopentanone oxime, chlorinates, Chlorates + metals, Chlorine trifluoride, Chlorosulfonic acid, 2-cyano-4-nitrobenzenediazonium hydrogen sulfate, Cuprous nitride, p-chloronitrobenzene, 1,5-Dinitronaphthlene +

sulfur, Diisobutylene, p-dimethylaminobenzaldehyde, 1,3-Diazidobenzene, Dimethylbenzylcarbinol + hydrogen peroxide, Epichlorohydrin, Ethyl alcohol + hydrogen peroxide, Ethylene diamine, Ethylene glycol and other glycols, , Ethylenimine, Fulminates, hydrogen peroxide, Hydrochloric acid, Hydrofluoric acid, Iodine heptafluoride, Indane + nitric acid, Iron, Isoprene, Lithium silicide, Mercuric nitride, Mesityl oxide, Mercury nitride, Metals (powdered), Nitromethane, Nitric acid + glycerides, p-Nitrotoluene, Pentasilver trihydroxydiaminophosphate, Perchlorates, Perchloric acid, Permanganates + benzene, 1-Phenyl-2-methylpropyl alcohol + hydrogen peroxide, Phosphorus, Phosphorus isocyanate, Picrates, Potassium tert-butoxide, Potassium chlorate, Potassium Permanganate and other permanganates, halogens, amines, Potassium Permanganate + Potassium chloride, Potassium Permanganate + water, Propiolactone (beta)-, Pyridine, Rubidium acetelyene carbide, Silver permanganate, Sodium, Sodium carbonate, sodium hydroxide, Steel, styrene monomer, toluene + nitric acid, Vinyl acetate, Thallium (I) azidodithiocarbonate, Zinc chlorate, Zinc Iodide, azides, carbonates, cyanides, sulfides, sulfites, alkali hydrides, carboxylic acid anhydrides, nitriles, olefinic organics, aqueous acids, cyclopentadiene, cyano-alcohols, metal acetylides, Hydrogen gas is generated by the action of the acid on most metals (i.e. lead, copper, tin, zinc, aluminum, etc.). Concentrated sulfuric acid oxidizes, dehydrates, or sulfonates most organic compounds.

Special Remarks on Corrosivity:

Non-corrosive to lead and mild steel, but dilute acid attacks most metals. Attacks many metals releasing hydrogen. Minor corrosive effect on bronze. No corrosion data on brass or zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2140 mg/kg [Rat.]. Acute toxicity of the vapor (LC50): 320 mg/m³ 2 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. May cause damage to the following organs: kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth.

Other Toxic Effects on Humans:

Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

Mutagenicity: Cytogenetic Analysis: Hamster, ovary = 4mmol/L Reproductive effects: May cause adverse reproductive effects based on animal data. Developmental abnormalities (musculoskeletal) in rabbits at a dose of 20 mg/m³ for 7 hrs.(RTECS) Teratogenicity: neither embryotoxic, fetotoxic, nor teratogenic in mice or rabbits at inhaled doses producing some maternal toxicity

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes severe skin irritation and burns. Continued contact can cause tissue necrosis. Eye: Causes severe eye irritation and burns. May cause irreversible eye injury. Ingestion: Harmful if swallowed. May cause permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the stomach, GI bleeding, edema of the glottis, necrosis and scarring, and sudden circulatory collapse(similar to acute inhalation). It may also cause systemic toxicity with acidosis. Inhalation: May cause severe irritation of the respiratory tract and mucous membranes with sore throat, coughing, shortness of breath, and delayed lung edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Cause corrosive action on mucous membranes. May affect cardiovascular system (hypotension, depressed cardiac output, bradycardia). Circulatory collapse with clammy skin, weak and rapid pulse, shallow respiration, and scanty urine may follow. Circulatory shock is often the immediate cause of death. May also affect teeth(changes in teeth and supporting structures - erosion, discoloration). Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect behavior (muscle contraction or spasticity), urinary system (kidney damage), and cardiovascular system, heart (ischemic heart leisons), and respiratory system/lungs(pulmonary edema, lung damage), teeth (dental discoloration, erosion). Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 49 mg/l 48 hours [bluegill/sunfish].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Sulfuric acid may be placed in sealed container or absorbed in vermiculite, dry sand, earth, or a similar material. It may also be diluted and neutralized. Be sure to consult with local or regional authorities (waste regulators) prior to any disposal. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sulfuric acid UNNA: 1830 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Illinois toxic substances disclosure to employee act: Sulfuric acid New York release reporting list: Sulfuric acid Rhode Island RTK hazardous substances: Sulfuric acid Pennsylvania RTK: Sulfuric acid Minnesota: Sulfuric acid Massachusetts RTK: Sulfuric acid New Jersey: Sulfuric acid California Director's List of Hazardous Substances (8 CCR 339): Sulfuric acid Tennessee RTK: Sulfuric acid TSCA 8(b) inventory: Sulfuric acid SARA 302/304/311/312 extremely hazardous substances: Sulfuric acid SARA 313 toxic chemical notification and release reporting: Sulfuric acid CERCLA: Hazardous substances.: Sulfuric acid: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R35- Causes severe burns. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S30- Never add water to this product. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 2

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References:

-Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

Other Special Considerations: Not available.

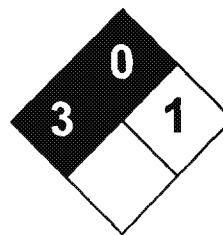
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Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet

Sodium Hydroxide, 50% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Hydroxide, 50%

Catalog Codes: SLS3127, SLS4549

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Sodium hydroxide; Water

CI#: Not applicable.

Synonym: Sodium Hydroxide, 50% Solution

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	50
Water	7732-18-5	50

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation

leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately. Finish by rinsing thoroughly with running water to avoid a possible infection.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Sodium hydroxide reacts to form explosive products with ammonia + silver nitrate. Benzene extract of allyl benzenesulfonate prepared from allyl alcohol, and benzene sulfonyl chloride in presence of aqueous sodium hydroxide, under vacuum distillation, residue darkened and exploded. Sodium Hydroxide + impure tetrahydrofuran, which can contain peroxides, can cause serious explosions. Dry mixtures of sodium hydroxide and sodium tetrahydroborate liberate hydrogen explosively at 230-270 deg. C. Sodium Hydroxide reacts with sodium salt of trichlorophenol + methyl alcohol + trichlorobenzene + heat to cause an explosion. (Sodium hydroxide)

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Sodium hydroxide STEL: 2 (mg/m3) from ACGIH (TLV) [United States] TWA: 2 CEIL: 2 (mg/m3) from OSHA (PEL) [United States] CEIL: 2 (mg/m3) from NIOSH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Alkaline. Bitter. (Strong.)

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Basic.

Boiling Point: 140°C (284°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 1.53 (Water = 1)

Vapor Pressure: The highest known value is 2.3 kPa (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, water/moisture

Incompatibility with various substances:

Reactive with oxidizing agents, reducing agents, metals, acids, alkalis. Slightly reactive with water

Corrosivity:

Extremely corrosive in presence of aluminum, brass. Corrosive in presence of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Hygroscopic. Much heat is evolved when solid material is dissolved in water. Therefore cold water and caution must be used for this process. Generates considerable heat when a sodium hydroxide solution is mixed with an acid Sodium hydroxide solution and octanol + diborane during a work-up of a reaction mixture of oxime and diborane in tetrahydrofuran is very exothermic, a mild explosion being noted on one occasion. Reactive with water, acids (mineral, non-oxidizing, e.g. hydrochloric, hydrofluoric acid, muriatic acid, phosphoric), acids (mineral, oxidizing e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, formaldehyde), carbamates (e.g. carbanolate, carbofuran), esters (e.g. butyl acetate, ethyl acetate, propyl formate), halogenated organics (dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (acetone, acetophenone, MEK, MIBK), acid chlorides, strong bases, strong oxidizing agents, strong reducing agents, flammable liquids, powdered metals and metals (i.e. aluminum, tin, zinc, hafnium, rhenium, nickel), metals (alkali and alkaline e.g. cesium, potassium, sodium), metal compounds (toxic e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead), nitrides (e.g. potassium nitride, sodium nitride), nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic e.g. nitrobenzene, nitromethane), acetic anhydride, hydroquinone, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, hydrosulfuric acid, oleum, propiolactone, acrylonitrile, phosphorus pentoxide, chloroethanol, chloroform-methanol, tetrahydroborate, cyanogen azide, 1,2,4,5 tetrachlorobenzene, cinnamaldehyde. Reacts with formaldehyde hydroxide to yield formic acid, and hydrogen. (Sodium hydroxide)

Special Remarks on Corrosivity: Very caustic to aluminum and other metals in presence of moisture.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Investigation as a mutagen (cytogenetic analysis), but no data available. (Sodium hydroxide)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May be harmful if absorbed through skin. Causes severe skin irritation and burns. May cause deep penetrating ulcers of the skin. Eyes: Causes severe eye irritation and burns. May cause chemical conjunctivitis and corneal damage. Inhalation: Harmful if inhaled. Causes severe irritation of the respiratory tract and mucous membranes with coughing, burns, breathing difficulty, and possible coma. Irritation may lead the chemical pneumonitis and pulmonary edema. Causes chemical burns to the respiratory tract and mucous membranes. Ingestion: May be fatal if swallowed. May cause severe and permanent damage to the digestive tract. Causes

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sodium hydroxide, solution (Sodium hydroxide) UNNA: UN1824 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information**Federal and State Regulations:**

Illinois toxic substances disclosure to employee act: Sodium hydroxide Illinois chemical safety act: Sodium hydroxide New York release reporting list: Sodium hydroxide Rhode Island RTK hazardous substances: Sodium hydroxide Pennsylvania RTK: Sodium hydroxide Minnesota: Sodium hydroxide Massachusetts RTK: Sodium hydroxide New Jersey: Sodium hydroxide Louisiana spill reporting: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water CERCLA: Hazardous substances.: Sodium hydroxide: 1000 lbs. (453.6 kg);

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

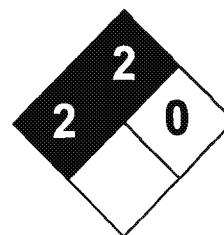
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	2
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Naphthalene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Naphthalene

Catalog Codes: SLN1789, SLN2401

CAS#: 91-20-3

RTECS: QJ0525000

TSCA: TSCA 8(b) inventory: Naphthalene

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C₁₀H₈

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Naphthalene	91-20-3	100

Toxicological Data on Ingredients: Naphthalene: ORAL (LD50): Acute: 490 mg/kg [Rat]. 533 mg/kg [Mouse]. 1200 mg/kg [Guinea pig]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit]. VAPOR (LC50): Acute: 170 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant, permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 567°C (1052.6°F)

Flash Points: CLOSED CUP: 88°C (190.4°F). OPEN CUP: 79°C (174.2°F).

Flammable Limits: LOWER: 0.9% UPPER: 5.9%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Israel: TWA: 10 (ppm) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [1995] TWA: 52 STEL: 79 (mg/m3) from ACGIH [1995]
Australia: STEL: 15 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline solid.)

Odor: Aromatic.

Taste: Not available.

Molecular Weight: 128.19 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 218°C (424.4°F)

Melting Point: 80.2°C (176.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.162 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 4.4 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.038 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:

Partially dispersed in hot water, methanol, n-octanol. Very slightly dispersed in cold water. See solubility in methanol, n-octanol.

Solubility:

Partially soluble in methanol, n-octanol. Very slightly soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: May attack some forms of rubber and plastic

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 490 mg/kg [Rat]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 170 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 305.2 ppm 96 hour(s) [Trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Naphthalene, refined : UN1334 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Naphthalene Pennsylvania RTK: Naphthalene Florida: Naphthalene Minnesota: Naphthalene Massachusetts RTK: Naphthalene TSCA 8(b) inventory: Naphthalene TSCA 8(a) PAIR: Naphthalene TSCA 8(d) H and S data reporting: Naphthalene: 06/01/87 SARA 313 toxic chemical notification and release reporting: Naphthalene: 1% CERCLA: Hazardous substances.: Naphthalene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-4: Flammable solid. CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R36- Irritating to eyes. R40- Possible risks of irreversible effects. R48/22- Harmful: danger of serious damage to health by prolonged exposure if swallowed. R48/23- Toxic: danger of serious damage to health by prolonged exposure through inhalation. R63- Possible risk of harm to the unborn child.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 2

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

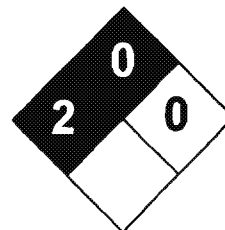
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Science Lab
Chemicals & Laboratory Equipment



Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet Ammonium hydroxide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ammonium hydroxide

Catalog Codes: SLA3667, SLA3490, SLA1144

CAS#: 1336-21-6

RTECS: BQ9625000

TSCA: TSCA 8(b) inventory: Ammonium hydroxide

CI#: Not applicable.

Synonym: Aqueous Ammonia; Strong Ammonia Solution;
Stronger Ammonia Water

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ammonia, anhydrous	7664-41-7	27-31
Water	7732-18-5	69-73

Toxicological Data on Ingredients: Ammonia, anhydrous: GAS (LC50): Acute: 2000 ppm 4 hours [Rat]. 4230 ppm 1 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant), of ingestion. Non-corrosive to the eyes. Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. **MUTAGENIC EFFECTS:** Mutagenic for bacteria and/or yeast. [Ammonia, anhydrous]. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic

to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately. Finish by rinsing thoroughly with running water to avoid a possible infection.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Hazardous decomposition include Nitric oxide, and ammonia fumes

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Forms explosive compounds with many heavy metals such as silver, lead, zinc and their halide salts. It can form shock sensitive compounds with halogens, mercury oxide, and silver oxide.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from ACGIH (TLV) [United States] TWA: 50 STEL: 35 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 35 from NIOSH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ammonia-like (Strong.)

Taste: Acrid.

Molecular Weight: 35.05

Color: Colorless.

pH (1% soln/water): 11.6 [Basic.] This is the actual pH in a 1 N solution.

Boiling Point: Not available

Melting Point: -69.2°C (-92.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.898 (Water = 1)

Vapor Pressure: 287.9 kPa (@ 20°C)

Vapor Density: Not available

Volatility: Not available.

Odor Threshold: 5 - 50 ppm as ammonia

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, high temperatures

Incompatibility with various substances:

Highly reactive with metals. Reactive with acids. Slightly reactive to reactive with oxidizing agents.

Corrosivity:

Extremely corrosive in presence of zinc, of copper. Corrosive in presence of aluminum. Non-corrosive in presence of glass, of stainless steel(304), of stainless steel(316).

Special Remarks on Reactivity:

Incompatible with the following: Organic acids, amides, organic anhydrides, isocyanates, vinyl acetate, epichlorhydrin, aldehydes, Acrolein, Acrylic acid, chlorosulfonic acid, dimethyl sulfate, fluorine, gold + aqua regia, hydrochloric acid, hydrofluoric acid, hydrogen peroxide, iodine, nitric acid, oleum, propiolactone, propylene oxide, silver nitrate, silver oxide, silver oxide + ethyl alcohol, nitromethane, silver permanganate, sulfuric acid, halogens. Forms explosive compounds with many heavy metals (silver, lead, zinc) and halide salts.

Special Remarks on Corrosivity:

Dissolves copper and zinc. Corrosive to aluminum and its alloys. Corrosive to galvanized surfaces. Severe corrosive effect on brass and bronze

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 350 mg/kg [Rat].

Chronic Effects on Humans:

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Ammonium hydroxide]. May cause damage to the following organs: mucous membranes, skin, eyes.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals: Highly toxic to aquatic organisms

Special Remarks on Chronic Effects on Humans:

May affect genetic material based on tests with microorganisms and animals. May cause cancer (tumorigenic) based on animal data. No human data found at this time. (Ammonia, anhydrous)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes severe irritation. Causes skin burns. May cause deep, penetrating ulcers of the skin. Contact with skin may cause staining, inflammation, and thickening of the skin. Eye: Contact with liquid or vapor causes severe burns and possible irreversible eye damage including corneal injury and cataracts. Inhalation: Causes severe irritation of the upper respiratory tract with coughing, burns, breathing difficulty. May cause acute pulmonary edema, pneumoconiosis, fibrosis, and even coma. It is a respiratory stimulant when inhaled at lower concentrations. It may also affect behavior/central nervous system (convulsions, seizures, ataxia, tremor), cardiovascular system (increase in blood pressure and pulse rate). Ingestion: Harmful if swallowed. Affects the Gastrointestinal tract (burns, swelling of the lips, mouth, and larynx, throat constriction, nausea, vomiting, convulsions, shock, and may cause severe and permanent damage), liver, and urinary system (kidneys) May affect behavior (convulsions, seizures, ataxia, excitement). Chronic Potential Health Effects: Ingestion: May cause effects similar to those of acute ingestion. Inhalation: Repeated exposure to low concentrations may cause bronchitis with cough, phlegm, and/or shortness of breath. May also cause liver and kidney damage, and affect the brain, and blood. Eye: May cause corneal damage and the development of cataracts and glaucoma. Skin: Repeated skin contact to low concentrations may cause dryness, itching, and redness (dermatitis)

Section 12: Ecological Information**Ecotoxicity:**

Ecotoxicity in water (LC50): 0.1 ppm 24 hours [Rainbow trout]. 8.2mg/l 96 hours [Fathead minnow]. 0.1 ppm 48 hours [Bluegill].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Ammonia Solution UNNA: 2672 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information**Federal and State Regulations:**

Connecticut hazardous material survey.: Ammonium hydroxide Illinois toxic substances disclosure to employee act: Ammonium hydroxide Illinois chemical safety act: Ammonium hydroxide New York release reporting list: Ammonium hydroxide Pennsylvania RTK: Ammonium hydroxide Massachusetts RTK: Ammonium hydroxide Massachusetts spill list: Ammonium hydroxide New Jersey: Ammonium hydroxide New Jersey spill list: Ammonium hydroxide New Jersey toxic catastrophe prevention act: Ammonium hydroxide Louisiana spill reporting: Ammonium hydroxide California Director's List of Hazardous Substances (8 CCR 339): Ammonium hydroxide TSCA 8(b) inventory: Ammonium hydroxide CERCLA: Hazardous substances.: Ammonium hydroxide: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

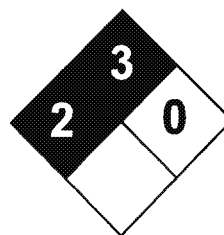
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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C₆H₅CH₃ or C₇H₈

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N₂O₄; AgClO₄; BrF₃; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m³) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:

Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Causes mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abrasions. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. **Chronic Potential Health Effects:** Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophosphatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

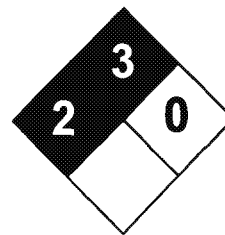
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

p-Xylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: p-Xylene

Catalog Codes: SLX1120

CAS#: 106-42-3

RTECS: ZE2625000

TSCA: TSCA 8(b) inventory: p-Xylene

CI#: Not applicable.

Synonym: p-Methyltoluene

Chemical Name: 1,4-Dimethylbenzene

Chemical Formula: C₆H₄(CH₃)₂

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{p-}Xylene	106-42-3	100

Toxicological Data on Ingredients: p-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 12400 mg/kg [Rabbit.]. VAPOR (LC50): Acute: 4550 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) TWA: 434 STEL: 651 (mg/m3) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 138°C (280.4°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 9 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:

Easily soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 5000 mg/kg [Rat.]. Acute dermal toxicity (LD50): 12400 mg/kg [Rabbit.]. Acute toxicity of the vapor (LC50): 4550 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier. 0900 Detected in maternal milk in human. Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: p-Xylene Florida: p-Xylene Massachusetts RTK: p-Xylene New Jersey: p-Xylene TSCA 8(b) inventory: p-Xylene SARA 313 toxic chemical notification and release reporting: p-Xylene CERCLA: Hazardous substances.: p-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R10- Flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes. R48/20- Harmful: danger of serious damage to health by prolonged exposure through inhalation.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET

COAL TAR

SECTION I - HAZARDOUS INGREDIENTS

<u>COMPONENT</u>	<u>CAS NO.</u>	<u>CONCENTRATION (% WT)</u>
COAL TAR	65996-89-6	100

SECTION II - PREPARATION INFORMATION

NONE

SECTION III - PRODUCT IDENTIFICATION

MANUFACTURER

TONAWANDA COKE CORPORATION
3875 RIVER ROAD
TONAWANDA, NY 14150
PHONE: 716 876-6222 FAX: 716 876-4400

SUPPLIER

TONAWANDA COKE CORPORATION
3875 RIVER ROAD
TONAWANDA, NY 14150
PHONE: 716 876-6222 FAX: 716 876-4400

PRODUCT NAME
COAL TAR

SYNONYMS

CRUDE COAL TAR, TAR, COAL TAR, CRUDE COKE OVEN TAR, COKE OVEN
TAR, HIGH TEMPERATURE COAL TAR

FORMULA

COMPLEX MIXTURE COMPOSED PRIMARILY OF CONDENSED AROMATIC
HETEROCYCLIC HYDROCARBONS. MAY CONTAIN MINOR AMOUNTS OF
PHENOLIC COMPOUNDS AND AROMATIC NITROGEN BASES.

CHEMICAL FAMILY
POLYNUCLEAR AROMATIC HYDROCARBONS

PRODUCT USE
FEED STOCK FOR TAR PRODUCTS

DOT DESCRIPTION
COMBUSTABLE LIQUID

UN NUMBER
1999

WHMIS CLASSIFICATION
BASED ON THE CRITERIA SET FORTH IN SECTIONS 34 THROUGH 36 OF THE
CONTROLLED PRODUCTS REGULATION OF CANADA, THIS PRODUCT IS
CLASSIFIED AS:
CLASS D, DIVISION 2, SUBDIVISION A; VERY TOXIC MATERIAL
CLASS B, DIVISION 3, COMBUSTIBLE LIQUID

SECTION IV - PHYSICAL DATA

PHYSICAL STATE	LIQUID
APPEARANCE AND ODOR AROMATIC	BLACK VISCOUS LIQUID WITH ODOR
ODOR THRESHOLD	NOT AVAILABLE
SPECIFIC GRAVITY (H ₂ O = 1)	1.16
VAPOR PRESSURE(mmHg)	@ 20°C = 0
VAPOR DENSITY(AIR = 1)	>1.0
EVAPORATION RATE	NOT AVAILABLE
BOILING POINT (°F) (BY ASTM D-2569)	>100°F
FREEZING POINT (°F)	NOT APPLICABLE
MELTING POINT (°F)	NOT APPLICABLE

ph	NOT APPLICABLE
SOLUBILITY IN WATER	NEGLIGIBLE
COEFFICIENT OF WATER/OIL DISTRIBUTION	NOT AVAILABLE
VISCOSITY	~1000 CENTIPOISE (cp) @ AMBIENT CONDITIONS ~100 cp @ 125°F

SECTION V - FIRE AND EXPLOSION HAZARD INFORMATION

CONDITIONS OF FLAMMABILITY: Crude coal tar at elevated temperatures may generate vapors that may ignite in the presence of air and a source of ignition.

EXTINGUISHING MEDIA: Use dry chemicals, carbon dioxide, sand, foam, steam, or water.

FIRE-FIGHTING PROCEDURES: Wear fire service protective equipment and, if required, full-face MSHA/NIOSH approved self-contained breathing apparatus. Water/fog can control unconfined tar fires, but water may cause frothing or eruption in closed containers.

Use water or water spray to cool fire-exposed containers and structures and to protect personnel.

UNUSUAL FIRE AND EXPOSURE HAZARDS: Products of combustion may include toxic vapors. Vapors may form an exposure hazard in confined areas. Heating may cause flammable or explosive vapors. Water may cause frothing or eruption in closed containers.

FLASH POINT: (by Pensky-Martins closed cup (PMCC) flash tester (ASTM D93-90)): 160°F

FLAMMABLE LIMITS: Not Available

AUTOIGNITION TEMPERATURE: Not Available

HAZARDOUS COMBUSTION PRODUCTS: CO₂, CO, NO_x, SO_x, and PAH's

SENSITIVITY TO IMPACT: No

SENSITIVITY TO STATIC DISCHARGE: No

SECTION VI - REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY: Product is stable under normal conditions of storage and transport.

CONDITIONS TO AVOID: Excessive heat, sparks, and open flames.

INCOMPATIBILITY (materials to avoid): Avoid contact with oxidizing agents and acids.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION: None

HAZARDOUS DECOMPOSITION PRODUCTS: Will liberate toxic vapors upon thermal decomposition or oxidation.

SECTION VII - TOXICOLOGICAL PROPERTIES

ROUTES OF ENTRY

Skin Contact ☒ Skin Absorption ☐ Eye Contact ☒ Ingestion ☒ Inhalation ☒

EFFECTS OF ACUTE EXPOSURE:

SKIN CONTACT EFFECTS: Contact with the skin can result in irritation which, when accentuated by sunlight, may result in a phototoxic skin reaction. Contact with heated material may cause thermal burns. Hot/molten crude coal tar is a severe burn hazard. Prolonged and repeated skin contact in the absence of recommended hygiene practices may cause acne, folliculitis and more serious skin disorders such as changes in skin pigmentation, ulcerations, benign skin growths, and skin cancer.

EYE CONTACT EFFECTS: Exposure to fumes, vapors or dust may cause irritation and burning to the eyes. Reversible symptoms may include irritation, a burning sensation, intolerance to light, redness/swelling/tearing, and possible erosion of the surface of the cornea. Contact with heated material may cause thermal burns.

INGESTION EFFECTS: Ingestion of crude coal tar may cause irritation of the gastrointestinal tract followed by one or more of the following: nausea; vomiting; and abdominal discomfort.

INHALATION EFFECTS: Inhalation of fumes, vapors, or dust may cause temporary respiratory irritation. Acute respiratory effects caused by overexposure to crude coal tar volatiles may include coughing, sneezing, and swollen or irritated nasal mucosa or sinuses.

INHALATION EFFECTS (CONT)

Inhalation of fumes or vapors in significant excess of the PEL/TLV may lead to systemic symptoms such as salivation; vomiting; respiratory difficulties; headache; loss of pupillary reflexes; central nervous system (CNV) effects such as dizziness, weakness, possible loss of coordination and collapse; cyanosis; hypothermia; and convulsions.

EFFECTS OF CHRONIC EXPOSURE: See "Skin Contact Effects" above and "Other" comments below.

SENSITIZATION: None known.

REPRODUCTIVE TOXICITY AND TERATOGENICITY: None known. Although crude coal tar does contain substances considered to be reproductive hazards by the State of California, no scientific study supports an association between crude coal tar exposures and human reproductive hazards.

IRRITANCY: See "Effects of Acute Exposure" and "Effects of Chronic Exposure."

SYNERGISTIC EFFECTS: None Known.

PERSONS MORE SUSCEPTIBLE TO EXPOSURE: Individuals with chronic respiratory disorders may be more susceptible to the effects of exposure to any airborne material. Individuals with pre-existing skin disorders may be more susceptible to irritation, dermatites, and phototoxic reactions. Persons with a history of central nervous system functional illness may be more susceptible to the effects when working with this product (see "Effects of Acute Exposure").

OTHER COMMENTS:

MUTAGENICITY: Available data characterizes crude coal tar as a mutagen.

CARCINOGENICITY:

NTP ☒ IARC ☒ OSHA ☒ ACGIH ☒

California Proposition 65: WARNING: This product contains a chemical to the State of California to cause cancer.

EXPOSURE LIMIT(PRODUCT): OSHA PEL/ACCGIH TLV = 0.2 mg/m³ (as coal tar pitch volatiles, benzene soluble fraction).

SECTION VII - PREVENTIVE MEASURES

RESPIRATORY PROTECTION: The need for respiratory protection depends on the type and magnitude of exposure. Use a MSHA/NIOSH or NIOSH approved respirator. Approved MSHA/NIOSH or NIOSH respirators include either of the following, as required: a half-face or full-face piece respirator with an organic cartridge or an organic vapor/particulate cartridge; or a full-face piece continuous flow, positive pressure air supplied respirator.

SKIN PROTECTION: As required to prevent skin contact, wear gloves, footwear and appropriate protective clothing. When exposure may occur, application of certain protective creams and sunscreens formulated for coal tar products may be beneficial. Remove and launder contaminated clothing separate from other laundry before reuse.

EYE PROTECTION: Wear safety glasses (with side shields), goggles, chemical splash proof shield or other protective eye wear according to; the ANSI Eye and Face Protection Standard Z87.1 (OSHA 29 CFR 1910.133).

PERSONAL HYGIENE: Wash exposed areas thoroughly with soap and water after handling and especially before eating, drinking, using tobacco products or restrooms. Do not smoke or eat in areas where this material is handled.

HANDLING PROCEDURES AND EQUIPMENT: Avoid prolonged or repeated contact with skin or breathing of dust, fumes, or vapors. Observe good personal hygiene practices and recommended procedures. Avoid contact with material. Wear appropriated protective equipment. Keep away from sources of extreme heat and ignition, strong acids and strong oxidizing agents.

ENGINEERING CONTROLS: Provide sufficient general or local exhaust ventilation in pattern/volume, as necessary, to maintain concentrations below the PEL/TLV and to maintain areas below flammable explosive vapor conditions.

SPILL OR LEAK PROTECTION: Avoid breathing fumes and vapors or contact with skin and eyes. Remove all ignition sources. Try to stop the source of the leak if possible without hazard. Ventilate the area if spill occurs indoors. Contain by diking/berming with absorbent solids, such as sand, ashes, earth, coke breeze, or coal, as necessary to prevent entry into sewers or open bodies of water.

Due to the concentration of benzo(b)fluoranthene (~7900ppm) and the reportable quantity for this substance (1 pound) a CERCLA release of approximately 13 gallons of crude coal tar requires National Response Center notification.

WASTE DISPOSAL: In the U.S., dispose of the material as required by applicable federal, state, and local regulations. In Canada, dispose of the material in accordance with provincial regulations.

STORAGE REQUIREMENTS: Store in a labeled container in a well-ventilated area away from all sources of excessive heat, ignition, strong acids, and oxidizing agents. Protect containers from physical damage. Maintain good housekeeping.

SPECIAL SHIPPING INFORMATION:

DOT Shipping Description: Coal Tar Liquid

SECTION IX - FIRST AID MEASURES
--

INHALATION FIRST AID: Remove subject from exposure area to fresh air immediately. If breathing is difficult, give oxygen. If breathing has stopped, administer artificial respiration (e.g. mouth-to-mouth). Seek medical aid immediately

SKIN CONTACT FIRST AID: For contact with MOLTEN product, do not remove contaminated clothing. Flush skin immediately with large amounts of cold water. If possible, submerge area in cold water. Pack with ice. Seek medical aid immediately. For other contact, remove all contaminated clothing and wash exposed area thoroughly with nonabrasive soap and water, or a mild detergent.

EYE CONTACT FIRST AID: Flush eyes immediately with large amounts of water for at least 15 minutes, occasionally lifting the eyelids. Seek medical aid immediately.

INGESTION FIRST AID: If the person is conscious, first induce vomiting to prevent further absorption. Do not give anything by mouth to an unconscious person. Give oxygen if respiration is shallow. Seek medical aid immediately.

SECTION X - ENVIRONMENTAL/REGULATORY STATUS
--

TSCA STATUS: This product appears on the Toxic Substance Control Act (TSCA) Inventory.

RCRA: If discarded, this product may be considered a RCRA listed or characteristic waste. If recycled, contact with land must be avoided.

SARA SECTION 313: This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR Part 372, Subpart D.

COMPONENT	CAS NO.	CONCENTRATION (WT %)
Naphthalene	91-20-3	4.93
Polycyclic Aromatic Compounds		5.69
Benzene	71-43-2	0.11

INFORMATION LISTED IS BELIVED ACCURATE BUT NOT WARRANTED OR GUARANTEED.

Revision 1-02

**SLOSS INDUSTRIES CORPORATION
MATERIAL SAFETY DATA SHEET
COAL TAR LIGHT OIL**

Print Date: September 28, 1995

1. MATERIAL IDENTIFICATION

Manufacturer: Sloss Industries Corporation
3500 35th Avenue North
Birmingham, Alabama 35207

Phone numbers: Product information: 205/808-7914
8:00 AM to 4:30 PM Monday through Friday
24Hr contact: 205/808-7846
Transportation Emergencies:
Call CHEMTREC: 1/800/424-9300

DOT number: UN 1136 (see Section 14)

Shipping name: Coal tar distillates, flammable
(contains benzene, toluene, xylene)

CAS name: Coke Oven Light Oil (Coal)

CAS number: 65996-78-3

Formula: Mixture containing Benzene, Toluene, and Xylene

NFPA rating: Health 2; Flammability 3; Reactivity 0

HMIS rating: Health 2; Flammability 3; Reactivity 0; Personal Protection H

Synonyms: Light Oil, BTX, Benzol, Coal Tar Distillate

2. COMPONENTS

Light oil (CAS 65996-78-3) is a mixture consisting of:

<u>Material</u>	<u>CAS#</u>	<u>% by wt.</u>
Benzene	71-43-2	68
Toluene	108-88-3	24
Xylene	1300-73-8	7

These components are listed on the TSCA Inventory. See Sections 3, 8, and 11 for exposure information.

**SLOSS INDUSTRIES CORPORATION
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COAL TAR LIGHT OIL**

Print Date: September 28, 1995

6. ACCIDENTAL RELEASE MEASURES

1. Evacuate unauthorized personnel and ventilate. Wear adequate personal protection while working with spill. See Section 8.
2. Remove all sources of ignition. Stop leak if it can be done safely. Do not touch or walk through spilled material.
3. Small Spills: Take up sand or other absorbent material and place into containers for later disposal. See Section 13.
4. Large Spills: Dike far ahead of spill for later disposal. No smoking, flames or flares in hazard area. Isolate hazard area and restrict entry. See Section 13.
5. Do not leave spill unattended.

7. HANDLING AND STORAGE**Handling:**

1. This material is highly flammable. Handle in a well ventilated area.
2. The benzene component of this material has a permissible exposure limit (PEL) of 1 ppm. Ventilation capable of maintaining exposure levels below this limit is recommended.
3. In cases where adequate ventilation is not possible, use a NIOSH/MSHA approved organic vapor respirator or airline supplied respirator depending on concentration.
4. Always wear proper personal protective clothing (see Section 8).

Storage:

1. Store in a cool, well ventilated location away from heat, spark or flame.
2. Store separate from incompatible materials. See Section 10.
3. Take necessary grounding and bonding precautions against build up of static electricity when transferring material.

**SLOSS INDUSTRIES CORPORATION
MATERIAL SAFETY DATA SHEET
COAL TAR LIGHT OIL**

Print Date: September 28, 1995

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Yellowish liquid
Odor:	Disagreeable sulfur odor
Physical state:	Liquid
Vapor pressure:	Not established
Vapor density (air=1):	3.0
Boiling point:	176°F (80°C)
Freezing point:	Not established
Solubility in water:	0.01%
Percent volatile by volume:	99%
Specific gravity:	0.87 at 60°F (15.5°C)

10. STABILITY AND REACTIVITY

- a. Stability: Stable
- b. Hazardous Polymerization: Will not occur
- c. Incompatibility: Strong oxidizers acids, and sources of ignition. Avoid elevated temperatures and storage in locations with inadequate ventilation.
- d. Decomposition products: Acid smoke, irritating fumes and toxic oxides of carbon.

**SLOSS INDUSTRIES CORPORATION
MATERIAL SAFETY DATA SHEET
COAL TAR LIGHT OIL**

Print Date: September 28, 1995

11. TOXICOLOGICAL INFORMATION**ACUTE**LS₅₀ (rat) 10,000 ppm/7 hours (Benzene component)LD₅₀ (rat-oral) 9980 mg/Kg (Benzene component)**Irritation data:**

Rabbit (skin) 2mg/24 hours - severe (Benzene component)

Toxicity data:

Mutagenic data (RTECS); Reproductive effects data (RTECS); Tumorigenic data (RTECS)

CARCINOGENICITYNTP X IARC X (Group I) OSHA X ACGIH X

The above organizations consider the benzene component of this material to be a know carcinogen. Case reports and series have suggested a relationship between exposure to benzene and the occurrence of various types of leukemia. Case-control studies have also shown an increased odds ratio for exposure to benzene, but mixed exposure patterns and poorly defined exposures render their interpretation difficult. Chart studies have demonstrated an increased incidence of acute nonlymphocytic leukemia in workers exposed to benzene.

The following toxicological information is for the toluene component of this material. Overexposure to toluene can cause an increased heart rate. Toluene may cause cardiac sensitization. Repeated overexposure to the point of euphoria has caused encephalopathy, disequilibrium, bizarre behavior, and optic atrophy. Intentional sniffing can produce renal tubular defects with metabolic acidosis, and electrolyte abnormalities.

12. ECOLOGICAL INFORMATION

Environmental hazard. Keep out of waterways.

**SLOSS INDUSTRIES CORPORATION
MATERIAL SAFETY DATA SHEET
COAL TAR LIGHT OIL**

Print Date: September 28, 1995

13. DISPOSAL INFORMATION

Upon disposal Coal Tar Light Oil may become an EPA hazardous waste due to Ignitability (D001). Also, it may be a characteristic waste due to a leachable benzene content of greater than 0.5ppm (D018) as determined by the TCLP test. Benzene has a RCRA waste number of U019 and D018 and a CERCLA reportable quantity of 10 pounds.

Recycle or dispose of in accordance with Federal, State, and Local regulations.

Please note this information is for Coal Tar Light Oil in its original form. Any alterations can void this information.

14. TRANSPORTATION INFORMATION

Proper shipping name: Coal tar distillates, flammable
(contains benzene, toluene, xylene)

Hazard class: 3 (Flammable)

UN no: UN 1136

DOT/IMO label: Flammable Liquid

Special provisions: B1, T7, T30

Packaging:

a. group: II

b. authorization: 49 CFR 173.203 and 173.242

c. exceptions: 173.150

Quantity limitations:

a. passenger, aircraft or rail: 60 Liters

b. cargo only, aircraft: 220 Liters

Stowage provisions: A

Reportable quantity:

Benzene 10 pounds

Toluene 1000 pounds

Xylene 1000 pounds

Marine Pollutant

**SLOSS INDUSTRIES CORPORATION
MATERIAL SAFETY DATA SHEET
COAL TAR LIGHT OIL**

Print Date: September 28, 1995

15. REGULATORY INFORMATION

TSCA status:	On TSCA Inventory
CERCLA RQ:	
Benzene	10 pounds
Toluene	1000 pounds
Xylene	1000 pounds
SARA TITLE III:	
Section 203 TPQ:	no
Section 304 EHS:	no
Section 311/312:	fire, immediate, delayed
Section 313:	yes
California Proposition 65:	yes
WHIMS:	yes (0.1%)

**SLOSS INDUSTRIES CORPORATION
MATERIAL SAFETY DATA SHEET
COAL TAR LIGHT OIL**

Print Date: September 28, 1995

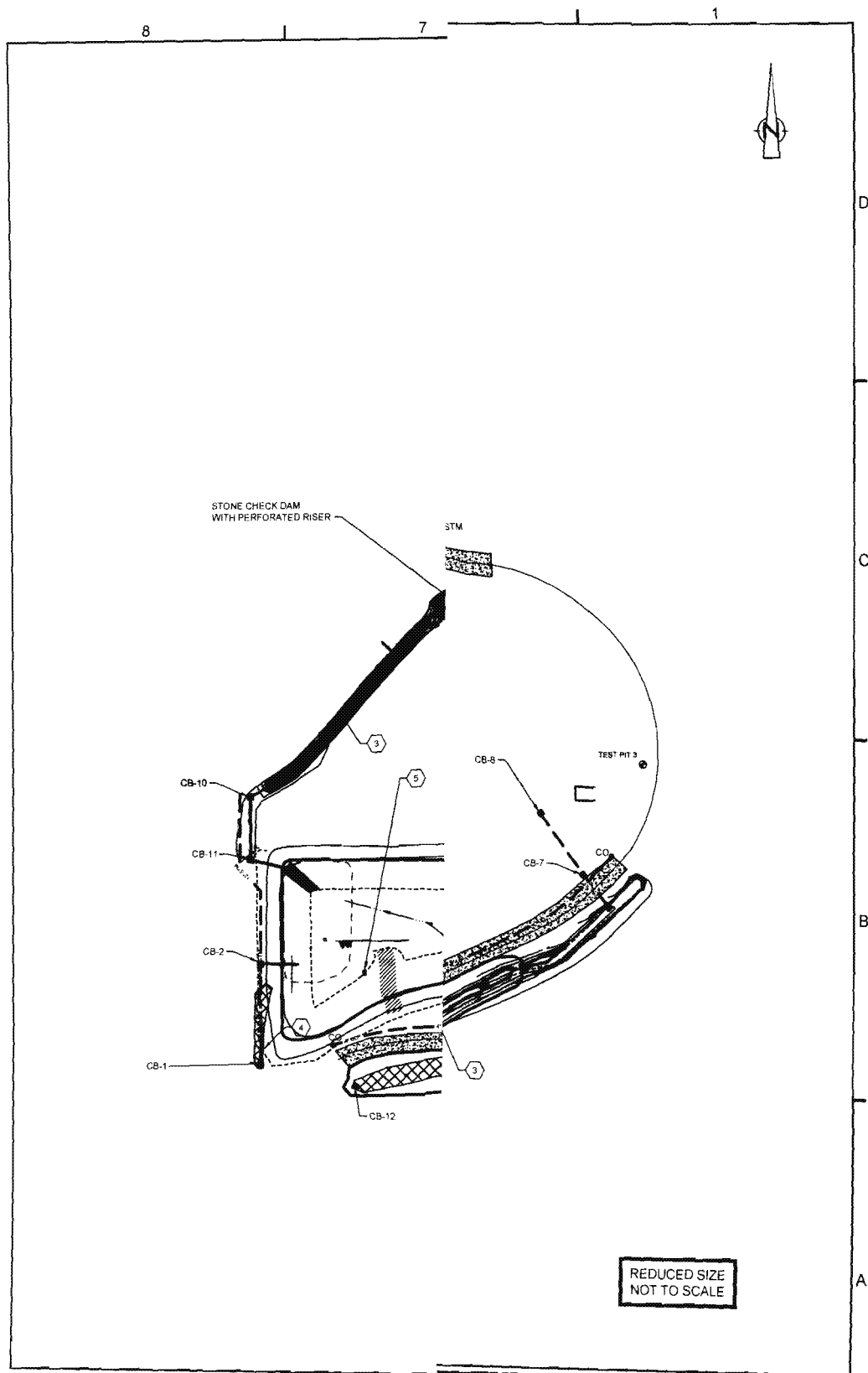
16. OTHER INFORMATION

Section(s) revised: All revised to new format and to include most up to date information.

MSDS date: 4/94

Supersedes date: 10/93

The data of the Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material. While the data contained herein is based on technical data that Sloss Industries Corporation believes to be reliable, it is intended for use by persons having technical skill and at their own discretion and risk.



KEYNOTES

- 1 15'-0" WIDE PERIMETER GRAVEL DRIVE
- 2 PROPOSED CLAY BERM, TOPSOIL & SEED
- 3 CLEAN AND REGRADE EXISTING SWALE
- 4 FILL EXISTING DITCH TO BE REMOVED
- 5 SEDIMENT DEPTH GAUGE

ION

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CRA Infrastructure & Engineering, Inc.

Source Reference		Date	
		AUGUST 2010	
Project Manager	Reviewed By	Designed By	Drawn By
B ADAMS	M ROTH	C KO-RICH	S PIKE
Scale	Project No	Report No	Drawing No
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